Special New York Show Issue

MOTOR AGE

Vol. XXXI
No. 1

CHICAGO, JANUARY 4, 1917

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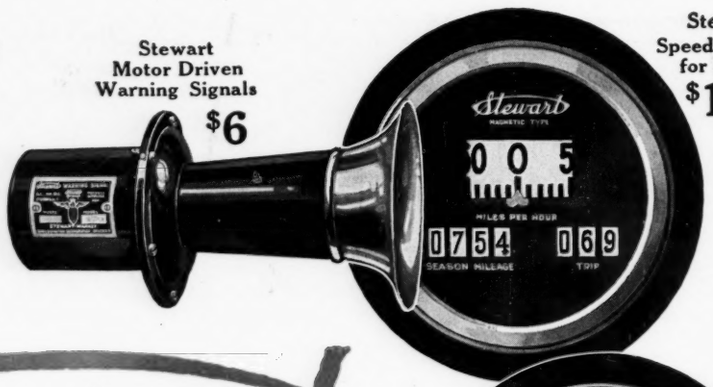

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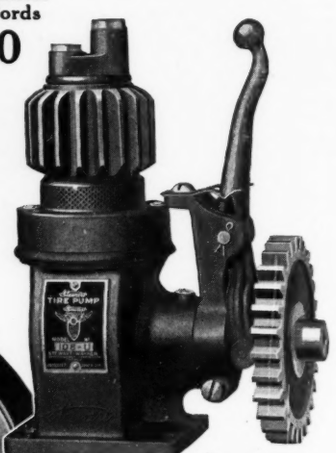

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MOTOR AGE

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ANNOUNCEMENT

The New York Show From the Inside will be the feature of Motor Age issue for Jan. 11 and will consist of a more intimate account of the display in the Grand Central Palace.

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1917 MODEL
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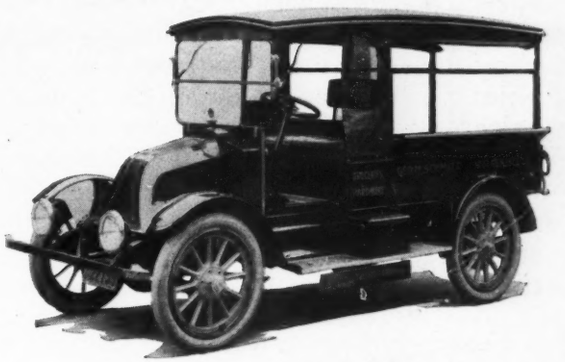

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IN SPECIFICATIONS

Turn to pages in this issue containing specifications of various cars and blue pencil the Studebaker specifications. Read them carefully—and then compare them, point by point, with the other cars in the Studebaker price range. Then compare Studebaker specifications, point by point, with cars costing more than Studebaker cars—and see for yourself just what it costs to obtain the same essentials of good motor car construction.

See if you can find another four-cylinder car at $940 with a 3⅞-inch bore x 5-inch stroke, forty horse power motor, a full-floating rear axle with complete equipment of Timken bearings, and with plenty of room for seven people in comfort, for anywhere near the price.

Take the specifications of all the six-cylinder cars listed—and note what you have to pay to obtain the full fifty horse power of the Studebaker "Six," the 122-inch wheelbase, seven-passenger capacity, full-floating rear axle and complete equipment of Timken bearings. See if you will find, in either a Four or a Six, individual and adjustable front seats, a reversible seat next to driver's, arm-chair auxiliary seats, and a host of other Studebaker conveniences at anywhere near the Studebaker price.

These are specific facts—they actually show where the Studebaker specifications, in comparison with the specifications of other cars, offer higher quality and greater value.

IN COMPARATIVE ANALYSIS

And, point by point, this analysis made by "Motor Age" in a purely unprejudiced way, proves that every important feature of Studebaker construction has been adopted by the majority of motor car builders.

It shows that every important feature of Studebaker construction is used either by the largest number of makers, or by those makers whose cars sell **for a much higher price** than Studebaker. "Motor Age" comparative analysis this week gives proof that not only in power, but in every important feature of construction, regardless of cost, Studebaker uses designs recognized by the majority of engineers as the best—and it offers further convincing proof that Studebaker is the world's leading manufacturer of fine cars.

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MOTOR AGE

Out of the Chrysalis of Past Effort

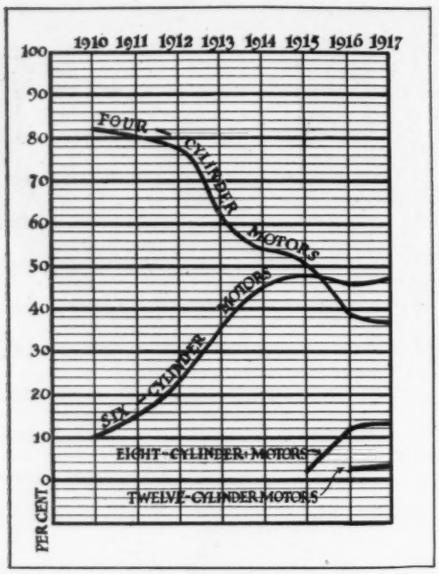
by Darwin S. Hatch

IT may not be wholly a novel idea to compare mechanical inventions and developments with the evolution of a butterfly, but in the case of the motor car, particularly as it applies to motor cars of 1917, this may be considered apropos in some respects. From the not wholly beautiful mechanism of several years ago, whose chief object was to provide a means of locomotion which would operate with some degree of continuousness the motor car has developed until it now is leaving its ungainly ugly stage and evolved into a thing of beauty. Whether or not it is a joy forever sometimes is a matter of opinion.

At any rate, motor car manufacturers are coming nearer the mark of making their product a vehicle less likely to cause lapses in the pleasure of life than have been developed before. The car has become a beautiful vehicle from an artistic standpoint as well as a utilitarian vehicle. The new cars combine the features of comfort and elegance to a degree heretofore unthought of and at the same time have been developed mechanically during the last year in many minor ways—none of them of radical quality and none that could be termed a real feature of mechanical radicalism.

With the opening of the annual motor car exhibition Saturday at the Grand Central Palace, New York, America has the first opportunity to view the production of the motor car makers of this country for the new year. This is the first really comprehensive display of America's motordom for 1917.

At first glance, in viewing the complete



How the proportions of chassis models of different numbers of cylinders have changed during eight years as told by the percentages of chassis models announced each year by the manufacturers

assembly of cars for the new season, one is impressed with the greater beauty and comfort of the new designs. These two features have been things of slow growth in the motor car. In the early days of the industry when motor cars were not vehicles but were machines, bodily comfort and beauty was considered very little.

Not All Sunshine

There is one feature, however, which will dampen the brilliancy of the prospects of the 1917 field so far as the motor car buyer is concerned, this is the fact that the prices of cars will be on the whole considerably greater than they have been for 1916. This is not news, but a study of the recent announcements of the manufacturers will show that the great majority of them have found it necessary to add considerably to the price of the car listed for 1916. In some instances this increase became necessary several months ago; in most, however, this becomes applicable to the cars sold beginning early in January. Some have found that they could hold this increase until later in the Spring. In any event, the new cars are more expensive.

This comes about through the increase in the cost of materials and increase in the cost of labor. Both of these factors are due, as almost every other factor of the high cost of living in our daily lives, to the European war.

This increase in cost of cars is taken up more in detail on other pages. It is a factor which will have great effect on motoring for next year, but within we have the ray of sunshine that through the increase in the cost of parts and labor there have been developed methods of economy among manufacturers and better methods of building which when conditions resume their normal state, should result in a decrease in the cost of production even below those costs before the start of the European war.

The fact must be borne in mind in considering this that the cars are better and more dependable than they have been previously, and in almost every instance an increase in price is not unaccompanied by an increase in the efficiency or dependability or comfort or appearance that make up for the difference in cost. There are some manufacturers both fortunate and far-sighted enough to have made long time contracts and made them long enough so that they can market their product at the same price, or possibly less than the former price.

Over 600 Models

The prospective motorists of 1917 will find in the succeeding pages of this issue complete specifications and illustrations of the motor cars manufactured by 138 American manufacturers, and will find listed therein 644 different car models.

In the roster of the car names the reader will find a number which were not listed among those present a year ago; similarly there will be found a smaller number whose names have disappeared from the roll for the past twelve months.

Among the new names to appear this year are the Aland, Bour-Davis, Brunswick, Chicago, Charter Oak, Columbia, Classic, Dixie Flyer, Drummond, Emerson, Geneva, HAL, Hatfield, Harroun, Hollier, Jordan, Kent, Laurel, Liberty, Maibohm, Majestic, Moore, Murray, Napoleon, Novara, Nelson, Phianna, Stevens, Templar and Yale.

There are a number of other new names which come from the same or reconstructed organizations that produced cars of a different name previously. Among these is the Hackett, which comes from the factory which originally produced the Argo; the Drexel is fathered by the same man that produced the Farmack; Marion-Handley to a certain extent supplants the Marion; the Roamer is the Halladay recreated; the Sterling has had a new syllable put to its name and is now the Ams-Sterling; the Richmond comes from the Wayne Works, and the Elcar is the new name of the Elkhart. The Woods dual power, for the first time appears among the gasoline cars.

There are in addition some names which have disappeared either because the manufacturers have definitely discontinued production or their plans are not sufficiently crystallized to be incorporated with the 1917 cars at this time. Among the missing are the Herff-Brooks, Lenox, Mecca, Morse, Republic, Spaulding, Stewart, Trumbull, and Vixen.

One will find that a name which formerly was in the forefront among American cars, and which disappeared for a time, has reappeared as the title of a new car. This is the American, which is now being produced by Louis Chevrolet.

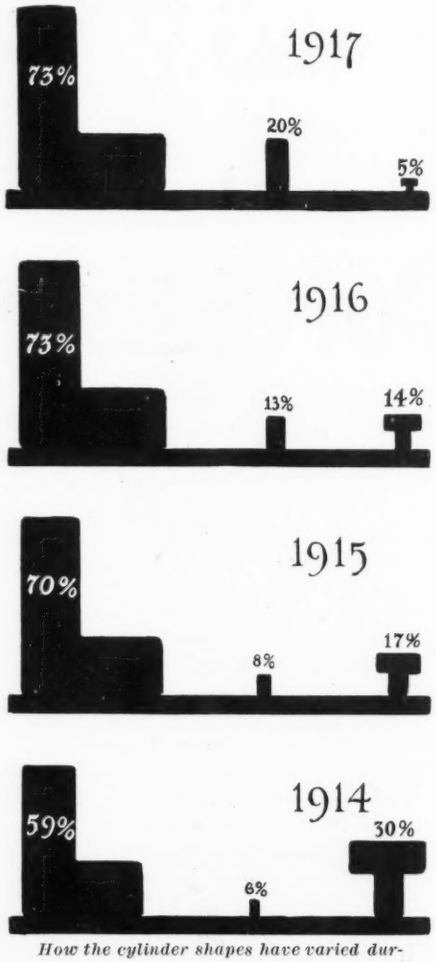
The motor cars as a whole are roomy; they seat their passengers with greater comfort, even though they may not expect to seat a greater number. This has been accomplished quite frequently by an increase in wheelbase. National has increased its wheelbase, Cadillac, Jeffery and Stutz also are longer.

New Body Designs

Alterations of the body shape and arrangement of the seating have been utilized by others in accomplishing the same results. In fact, Locomobile, Saxon, Kissel, Premier and Glide have accomplished the refinement in this manner.

One of the most notable of the comfort-making developments during the past year, and one which takes a most nearly complete form in the new cars, is the combination of winter-summer body styles. The convertible body is not a new idea, Kissel having brought out its All-Year bodies several years ago, and similar arrangements through which an inclosed top could be substituted for the open top for summer use has been part of the program of most car makers at the beginning of last year.

A newer type could be procured in a few of the early 1916 cars. For the new



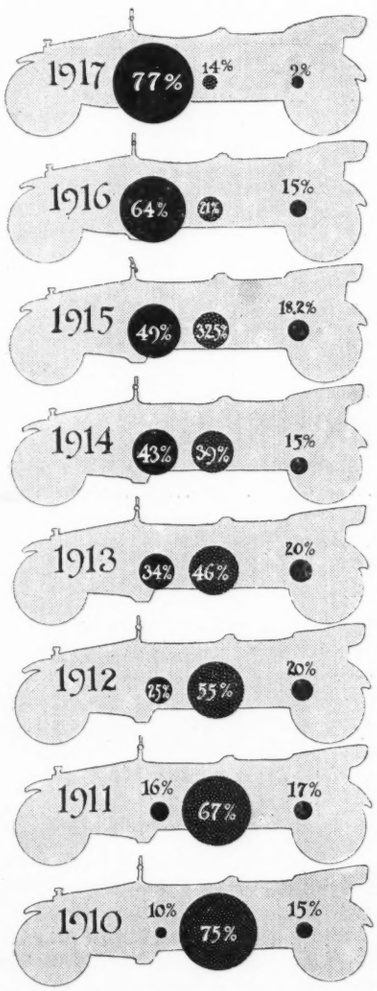
How the cylinder shapes have varied during four years as shown by the percentage of chassis models announced. Note the I-head or overhead-valve engine has grown from 6 percent in 1914 to 20 percent in 1917 and the diminution of the T-head and some falling off in L-head

season this new type is being exploited by a very respectable number of car makers. This body is variously known as the Springfield type, semi-limousine, touring-limousine, open-limousine, open-sedan and so on.

Comfort Features

Some of the other comfort features which mark advancement for the new season are the heaters for winter driving. Such are not fitted ordinarily as regular equipment, but both Haynes and Owen-Magnetic include Perfection heaters in their closed cars. Pathfinder supplies cigar lighters for the smokers. Another comfort feature is the inclusion of Hartford shock absorbers on the Haynes, and Gabriel snubbers on the Cadillac.

The comfort of the driver not always has been a prime consideration, but this year seems to have been taken into the designers' plans to a greater extent than previously. Adjustable steering columns, such as that on the Westcott, which can be raised or lowered, makes driving easier; the adjustable driver's seat, such as the Haynes has in a cloverleaf model, makes driving more easy. Better arrangement of the emergency and gearshift levers so that they will be easily reached without bending may be seen in the Jeffery, Kissel, Velie and Dort. Adjustable pedals have become the rule.



Movement of the gearset from its midship location to right behind the engine during eight years as indicated by the percentage of chassis models with gearsets amidships, and in unit with the motor. The rear axle proportion is shown

From the standpoint of external appearance, the improvement is marked. Straight lines from radiator to windshield, straight-side bodies, some with rolled edges and higher sides, all have had their effect in the improvement. The general tendency toward the rounded or barrel type of hood, of course, is the main factor. One of the most striking examples of this idea is the Franklin, one of the most conservative as to changes of this nature. The Franklin hood now has a smoothly rounded contour, which approaches in idea the original barrel type of engine hood which distinguished the air-cooled car years ago.

Probably the most pronounced movement in body styles is the rapid coming into popularity of the four-passenger roadster. The majority of the manufacturers during the past year have announced this new outgrowth of the three-passenger cloverleaf design. A number of others have accomplished the same results by what approaches more nearly a four-passenger touring car. Perhaps the difficulty that has prevented it coming before has been the fact that it is not at all easy to design a close-coupled body for four and have it sporty-looking with two occupants and at the same time comfortable when four are carried. The problem of leg room for rear passengers of average size without too long a cockpit is a difficult one.

One car, the Anderson, has carried out this idea to its logical conclusion with a folding rear deck behind the driver's seat, this deck disappearing when four are to be accommodated.

The newest idea of this nature, and one which offers many possibilities, is the new two or four-passenger sporting roadster of the Paige company. This has the convertible idea so far as expansion for passengers is concerned, carried out to the last degree.

Individuality Provided

There is one feature in the motor car arrangements for this year which the motorist will appreciate, and that is the increase in opportunities for individuality in body styles and colors. Custom body building arrangements, provided by such firms as Studebaker, Locomobile, Singer and others, permit the purchaser to have a body built to his own design by the factory that builds the chassis.

In addition, there is a greater range in color options than was presented before. Most of the very high-priced concerns have this feature. The Scripps-Booth now has this in restricted form, changing colors in a few weeks and offering options of color combinations.

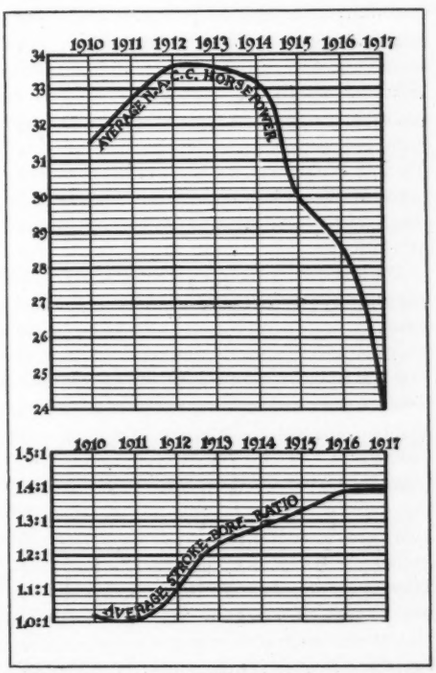
The development for the new year has not been entirely in the body. In fact, widespread refinements are found throughout the chassis. Perhaps the one real feature of the year from a mechanical standpoint which can be considered a possible trend for later consideration is the sixteen-valve engine, the engine having double intake and double exhaust valves in each cylinder. Now that White has joined the Stutz as the second exponent of this type to produce in quantities, the movement seems to be really under way. The first one announced was the Aland, a car which is not yet in large quantity production. As an answer to the multiple-cylinder question, this may have its effect in further development of the fours. The Buick recent announcement of a small four, in addition to the sixes which have been its sole production for 2 years, gives strength to this possibility of a consideration in some quarters of a possible return to the four.

Unification of Power Plant

The move toward unification of the power plant has been going on during the past year. This is a tendency which has been in evidence for the past 4 years. By far the majority of the new cars have the gearset in unit with the motor, the most recent converts being the Jeffery Six and the new White sixteen-valve four. Previously both the Jeffery Six and the White had the gearset amidships.

There is a trend toward the overhead-valve engine replacing both the T-head and the L-head. It is particularly noticeable in connection with the coming of the sixteen-valve engine. Both White and Stutz use an overhead-valve design, the former having an L-head and the latter a T-head.

Buick, which for the past few years has



Upper curve—How the horsepower rating of the engine has varied since 1910 as indicated by the average of all chassis models announced each year. Lower curve gives similar curve for the ratio of stroke to bore

confined itself to sixes, has added a four. Detroiter has added a six, Willys has added a Knight eight, and Chevrolet has added an eight. The twelve-cylinders have remained in status quo, as there have been neither additions nor reductions in the list of twelves during the year.

Among the cars in which the four-cylinder models have been dropped are the Auburn, Jackson, Kissel, Lexington, Oakland, Oldsmobile and Simplex. The Pathfinder has dropped its six and is contemplating only twelves. Pullman, Standard and Stearns-Knight likewise have discontinued the sixes. Abbott, Mitchell and Partin-Palmer no longer are listing eights for 1917.

Spiral teeth in the main bevel gears of the final drive has increased very perceptibly. The Overland 85 now has spiral-bevel as has the Dodge, Reo, White, Willys-Knight, Jeffery Six, Cameron, Davis, Elcar, Empire, Paterson and Richmond. The proportion of chassis equipped with spiral-bevel drive has increased from approximately one-half of the chassis models of 1916 to nearly three-quarters of the new models.

Wire wheels have been made more uniformly stock equipment than has been the case previously. Several of the concerns which offered only wood last year have made wire wheels optional on the 1917 cars and others, notably Stutz, Singer and Cameron are making wire wheels stock.

Semi-Elliptic Rear Springs

Rear suspension has undergone quite a marked change during the past season. This is toward the flatter type of spring, such as the cantilever and semi-elliptic spring replacing the three-quarter ellipties which have been in vogue before. The semi-elliptic spring in particular has quite a following for the first time this year. Such concerns as Buick, Cole, Fiat, Marion-Handley, Oakland, and White as well as Auburn, Luverne, Davis and others have specified semi-elliptic springs usually replacing the three-quarter elliptic. Overland, Willys-Knight and Chevrolet are fitting cantilever springs this year instead of the three-quarter elliptic of last year.

Methods of conveying the fuel from the supply tank to the carbureter have undergone a very radical change in favor of the vacuum gravity and similar systems. In practically three-quarters of the chassis, listed for the new year, vacuum feed from the main tank in the rear to the gravity feed from the supplementary tank is employed. Last year there was approximately one-half of the chassis models so equipped.

Single ignition is in favor with the greater proportion of the cars, better than four-fifths of the new motors having but one source of ignition supply, this being either the magneto or a generator-battery system. Double ignition this year has had a slight increase so far as the percentages of chassis models go. This is noticeable due to the fact that for the past 7 years double ignition has been on the wane.

Comparisons of Average American Car for 8 Years

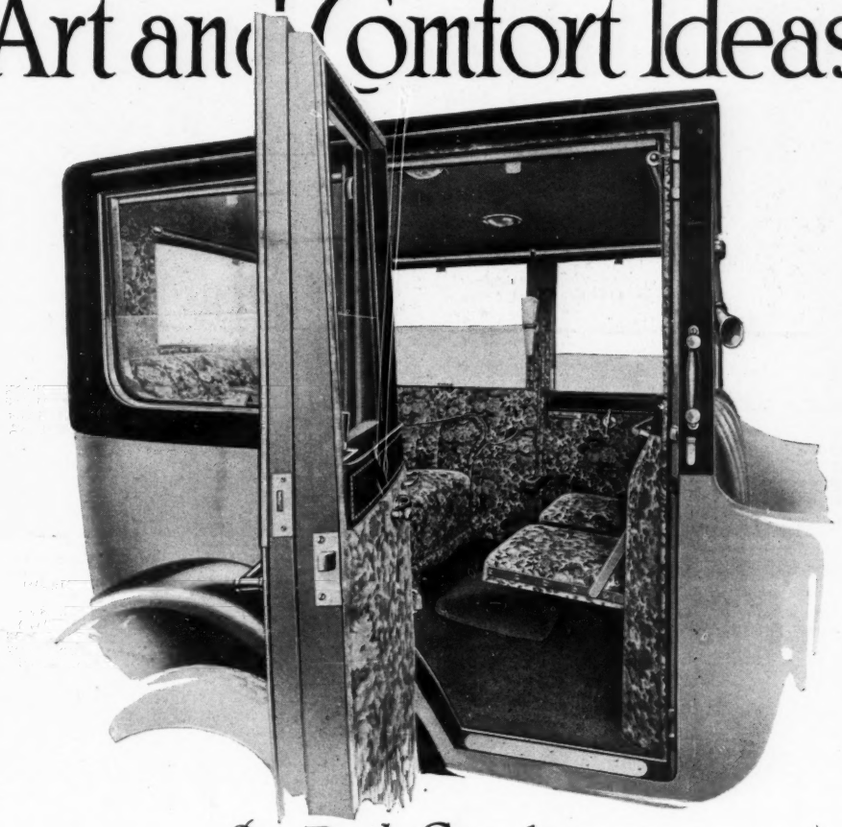
GENERAL AVERAGES

	1917	1916	1915	1914	1913	1912	1911	1910
Horsepower, N.A.C.C. rating	24.3	28.66	29.97	33.2	33.60	33.60	32.7	31.5
Bore	3.37	3.57	3.82	4.12	4.19	4.34	4.42	4.55
Stroke	4.66	4.97	5.10	5.28	5.15	4.97	4.46	4.68
Stroke-bore ratio	1.38	1.39	1.33	1.28-1	1.23-1	1.09-1	1.01-1	1.03-1
Piston displacement	222.5	278.87	307.38	349	345	316.2	313.2	281.5
Wheelbase	113.25	119.56	122.19	121	122	121	114	112
Gear ratio	4.15-1	4.08-1	3.88-1	3.6-1	3.57-1	3.62-1	...	...
Tires	31x3⅞	33x4½	34x4	35x4½	35x4½	35x4	34x4	34x4
Number cars	644	519	535	607	.....	.....	.....	.....
Number chassis	194	176	200	236	339	381	393	364
Number makes	138	108	119	133	156	193	270	239
Price	$1,687	$1,600	$2,005	$2,635	$2,585	$2,508	$2,560	$2,214

PERCENTAGE

Number of Cylinders								
One cylinder	0	0	0	0	0	1	1	5
Two cylinders	0	0	5	1	1	1	2	3
Four cylinders	37	39.2	51.0	54	62	78	80	82
Five cylinders	0	0	0	0	1	1	0	0
Six cylinders	47	45.8	47.5	45	36	19	17	10
Eight cylinders	12	12.6	1.0	0	0	0	0	0
Twelve cylinders	4	2.4	0	0	0	0	0	0
Shape of Cylinders								
T-cylinder type	5	13.7	16.5	30	31	30	22	20
L-cylinder shape	73	73.3	70.0	59	56	55	60	56
I-cylinder type	20	13.0	8.5	6	9	9	14	18
Knight type	2	3.6	3.0	3	3	2	1	0
Two-cycle	0	0	1.0	1	1	4	3	6
Mondex-Magic type	0	0	0	1	0	0	0	0
Gasoline electric	0	1	0	0	0	0	0	0
Cylinder Arrangement								
Cylinders cast separate	1	4.8	4.0	6	15	22	28	39
Cylinders cast in pairs	5	10.2	27.0	42	48	58	60	53
Cylinders cast in block	87	78.4	67.5	39	29	18	12	8
Cylinders cast in threes	7	6.6	10.5	13	8	2	0	0
Cooling								
Air-cooled	....	.6	.5	2	4	5	6	7
Thermo-Syphon	38	38.2	27	19	17	19	28	23
Pump circulating	62	61.2	72.5	79	79	76	66	70
Ignition Systems								
Single ignition	84	76.0	56	23	15	14	18	25
Dual ignition	9	19.2	36	59	68	63	53	40
Two-spark ignition	1	1.2	1.45	4	2	0	0	0
Double ignition	3	1.8	4.55	11	15	23	29	35
Duplex ignition	1	1.8	2.0	3	0	0	0	0
Dual-double	2	.....	.....	.....	.....	.....	.....	....
Motor Lubrication								
Splash oiling	35	52.7	46.5	42	53	68	81	0
Splash pressure oiling	35	23.35	16	39	32	20	0	0
Oil in fuel	0	.....	0	1	1	2	3	6
Pressure oiling	30	23.35	37.5	18	14	10	19	0
Splash gravity	....	.6	0	0	0	0	0	0
Engine starting								
Electric starter	99	98.8	94.5	87	37	2	0	0
Acetylene starter	0	0	0	1	14	0	0	0
Air starter	0	0	0	4	9	2	1	1
Optional starter	0	0	1.5	2	5	0	0	0
Mechanical starter	0	0	.5	1	4	0	0	0
No starter as stock	1	1.2	3.5	5	31	98	99	99
Fuel Feed								
Gravity fuel feed	18	31.8	57	58	65	75	81	82
Gravity-pressure fuel feed	1	2.4	.5	1	0	0	0	0
Pressure fuel feed	7	12.0	22	41	35	25	19	18
Vacuum feed	74	53.8	20.5	0	0	0	0	0
Type of Clutch								
Disk clutch	68	53.4	51	48	52	44	51	49
Cone clutch	30	45.6	44	41	45	52	47	39
Expanding band clutch	0	0	.5	3	1	3	2	6
Contracting band clutch	0	0	4.5	5	2	1	1	3
None	1	.....	.....	3	.....	.....	.....	.....
Electric	1	1	0	0	0	0	0	0
Type of Gearset								
Selective	98	96.5	91.5	95	94	92	90	85
Progressive	0	1.7	3.5	1	2	5	1	8
Planetary	.5	.6	1.0	1	1	2	4	4
Friction	1.5	1.2	2.5	3	3	1	5	3
Location of Gearset								
Amidship	14	20.6	32.5	39	46	55	67	75
Unit with axle	9	15.3	18.2	15	20	20	17	15
Unit with motor	77	64.1	49.3	43	34	25	16	10
None	.....	.....	.....	3	.....	.....	.....	.....
Wheels								
Wire wheels—demountable	10	6.5	7.0	4	3	0	0	0
Wood wheels	79	82.5	88.5	96	96	100	100	100
Optional	11	11.0	4.5	0	0	0	0	0
Final Drive								
Shaft and bevel	28	41.0	84.5	93	94	92	91	89
Chain	1.5	1.7	4.5	4	4	6	8	11
Shaft and worm	.5	.5	1.5	1	1	1	0	0
Roller	0	0	0	1	1	1	1	0
Shaft and spiral—bevel	70	56.8	9.5	1	.....	.....	.....	.....
Type of axle								
Floating	43.5	51.8	56.5	65	67	50	0	0
Semi-floating	25.5	23.6	23.0	17	26	49	0	0
Three-quarter floating	29.5	22.8	18.5	14	4	0	0	0
Seven-eighths floating	0	0	0	1	0	0	0	0
Dead rear axle	1.5	.6	2.0	3	3	1	0	0
Timing gear drive								
Spur gear	4	8.4	16.1	13	83	.....	.....	.....
Helical or spiral gear	74	73.0	73.7	77	10	.....	.....	.....
Silent chain	21	18.1	9.1	10	7	.....	.....	.....
Worm	1	.5	1.1	0	0	0	0	0
Starter voltage								
Six	87.5	.....	.....	.....	.....	.....	.....	.....
Twelve	11.5	.....	.....	.....	.....	.....	.....	.....
(24)	1	.....	.....	.....	.....	.....	.....	.....

Interior Decoration of the Car Art and Comfort Ideas



The open door is a universal sign of hospitality, and this door is no exception, for it also extends an invitation to enter. It very well might be taken as symbolic of the new era of inclosed cars. It reveals within all the simplicity and dignity that art and comfort ideas have been able to bring to the interior of the modern car and shows how so-called skin-deep beauty looks when given a chance to in the motor car

We have with us now—in this particular interior—a fair Lucille creation. Nobody in sight? The interior is the creation in mention, if you please. Lucille has the habit of pointing the Chalmers inclosed car in the direction it should go, selecting the fabrics and colors in general. Here she chooses a brocaded material. It may be a tan with rose figures or a rich silver or tan. The tan and rose is her own favorite

By Ruth Sanders

BEAUTY in motor cars also may be only skin deep, but as long as no power has the giftie gi'en us to see each of them as x-rays see them, why not encourage and enjoy that beauty as much as possible? Granted the first essentials of a motor car are an efficient engine and a strong, well-built body. In the light of present achievements, it is to be believed that more than our hopes even in this regard will be realized at no far date. If so, the energy so long directed to the pure mechanics of the car must be directed into other channels or wasted, and no better channel awaits that energy than that which gives beauty to the motor car—the interior.

Much has been said and done in regard to interior decoration of homes and public buildings in the past, especially in the last few years, and this may account to some extent for the growing tendency to have the field of this one of the so-called arts include the car in its scope. The principle is the same. Just as the person of taste prefers to live in a room of a restful combination of color, of comfort and of convenience, where furniture adds pleasure as well as serves as chairs, tables and so on, so does he prefer a car that reflects beauty and pleasure. And to obtain these features for the car the maker has called in the men and women in the field of art, among them decorators and dressmakers, persons trained to think in line and color.

New Vogue Brings Interior Decoration

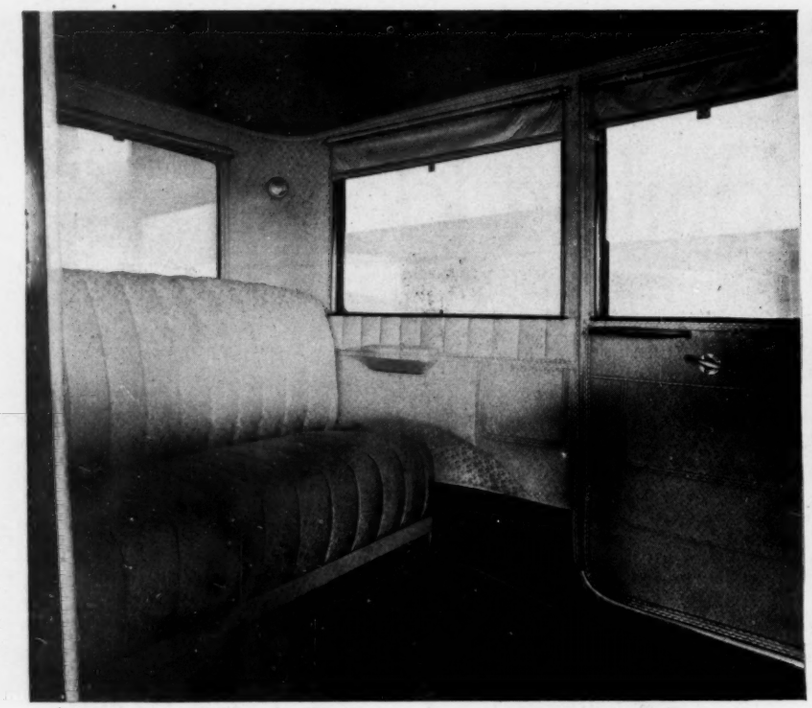
A new vogue in inclosed cars is here, in fact. The influence of the maker's clientele has induced him to consider the skin of his product. And it is an opportune time for him to do this. For he has been working on the lines of his car in general for quite a while and can give more thought to the interior now than he could have given a few years ago, when the junction of the hood and the windshield was a matter of so much discussion as to leave no time for the tonneau wherein the innocent passengers rode. Even now the maker is so busy seeking further improvements either in the construction or in the distribution of his product that it would seem he had enough to do without thinking of things esthetic rather than scientific. But having recognized the desire of the car buyer to have this esthetic element considered he turns over to the decorator the problem of supplying him with new means toward comfort and beauty. In this way it is likely that when he shall have attained the acme of those essentials, an efficient engine and a strong, well-built body, art will have made the science of his make complete by adding that skin without which it could not be complete.

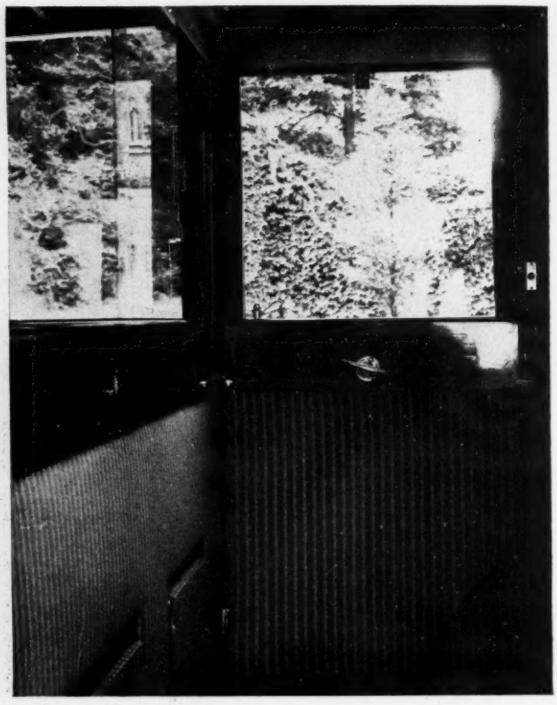
More Leisure For Interior Available

Two reasons, one due somewhat to the other, have helped bring the new vogue in inclosed cars. Improvement in mechanical construction has brought ease of operation, and ease of operation has made the car universal in use by the woman as well as the man. Both improvement and the woman occupant direct attention to the interior. Improvement, by eliminating certain problems, makes that much more leisure available for other effort. The woman occupant incites attempts to bring the interior of the car more closely into harmony with a woman's garments.

Changes in the interior of the car have been as remarkable in their degree as have those in production. The increased use of the car and the resultant demand for the winter, or closed, car have brought on more closed cars and a resultant increased use of the car. The development of the sedan and the convertible type is a part of the story, for the interior of these too are of moment, there being little distinction in the opportunity for interior decoration offered by limousine, town car and sedan.

No doubt the greatest change is that in the upholstery. Lux-





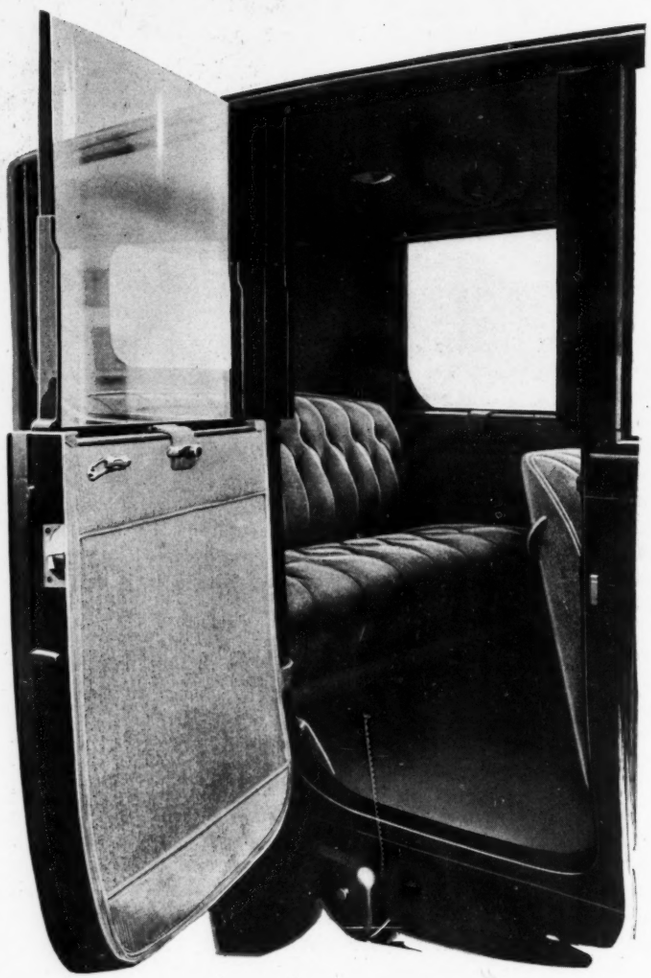
The Cadillac, to the left, shows a spacious interior, fitted in many respects as a room of the home might be. The silk curtains roll as in the drawing-room windows, and a reading light occupies a small part in the corner. The upholstery is plaited according to the new vogue. To the right appears a detail of a Chandler interior. Stripes are used, and the woodwork is grained in decorative mode. The method of disposal of the auxiliary seats can be seen. The whole interior is as simple as this corner

ury may never have been spelled d-i-a-m-o-n-d in the blue-backed speller, but it for years was the proper formula for luxury in the inclosed car. Diamond tufted upholstery, with buttons to make the dust more secure in its retirement, ended only in the much befringed decorations that supplemented it. Leather was the material de luxe, and it needed only to be "genuwine" to give supreme satisfaction to the buyer. Cloth was for those slip-on covers that supposedly protected the leather from the hot weather or the garments of the passengers from sinking too deeply into the leathery embrace. A brass rail, with its ruination for light colored shoes, finished the ensemble.

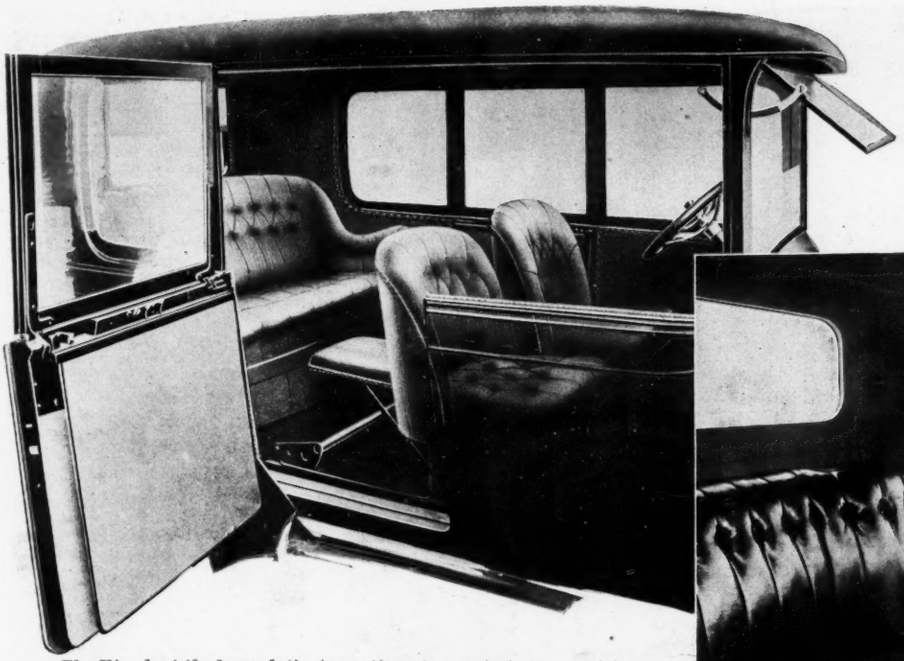
Dignity and Simplicity Reign Now

Dignity of simplicity is the keynote today. No longer does the interior attempt to express luxury, for character and individuality have come to mean more in the construction of the car, and one of the essentials of the interior decorator is to embody these features in the general effect and details of the inclosed car. Not that upholstery is no longer elaborate. The plainest things are the most elaborate sometimes, remember, as no doubt Lady Duff-Gordon, one of the most famous of new interior decorators of the inclosed car, probably could demonstrate to you. But expense is seen only, not heard, and the simplest, plainest interior may be so by virtue of the pains taken in the design and choice of material.

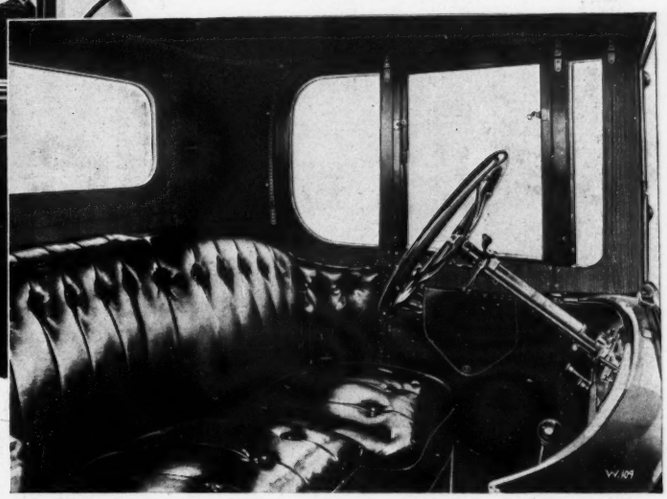
The lines of the interior are emphasized and are beautiful in themselves, making lavish decoration unnecessary. It is fitting that they should be more beautiful than in the past, for the body lines in general have become better in design each season and well deserve the best within. Each detail of the interior scheme has its purpose. Not only are the new plaited cushions less ready to give harbor to dust, but they blend more with the smoothly finished walls and well-thought-out woodwork. The theme of the whole decoration is to harmonize the cloth, metal and wood into a single impression of simplicity and, through simplicity, beauty. Contrast is given by the use of patterned fabrics for the seats and back rests and plain fabrics for the ceiling and sides. Or



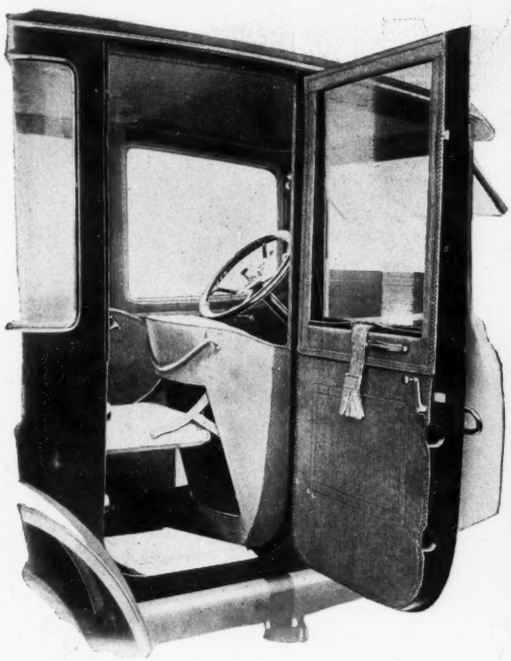
The Dodge opens a wide door to entrants. Notice that the door window has no frame. This is to avoid a black mark of obstruction to the view when the window is lowered for some reason. The upholstery is different from that of the Cadillac in the upper corner, but it follows the same idea of simplicity. The light in the ceiling is barely noticeable

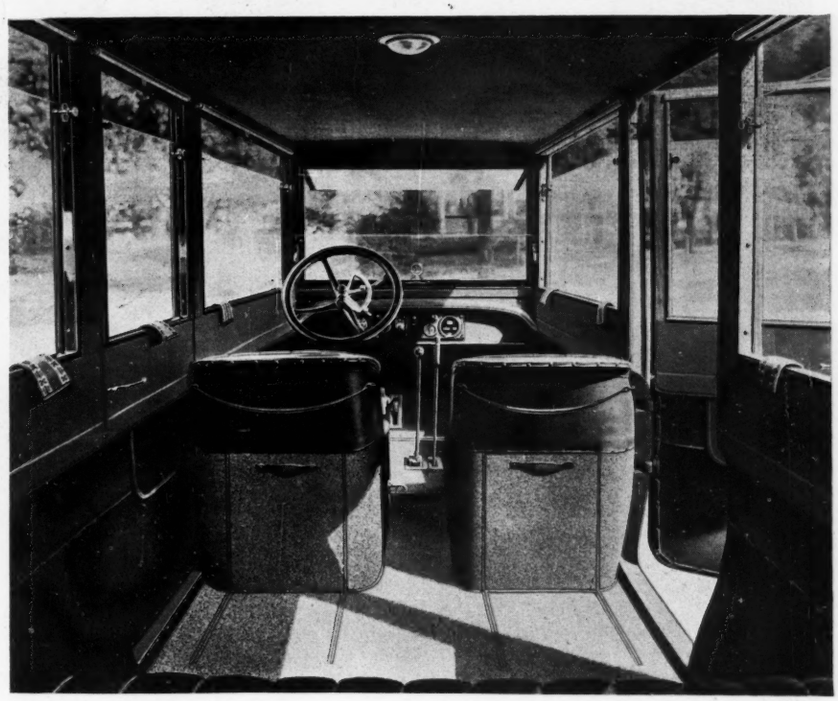


The Grant winter roadster gives us the leather cushions of the open car, but shows the newer treatment of the walls and the attractiveness of window lines. The Studebaker, to the left, shows well the seating arrangement found in the inclosed car since so much attention has been given it



The Kissel, at the lower left, stores its extra seats in a way of its own, but the same smooth surface covers them again. The Jeffery, at the lower right, is a good example of the little evidence that extra seats may leave behind them in the inclosed car

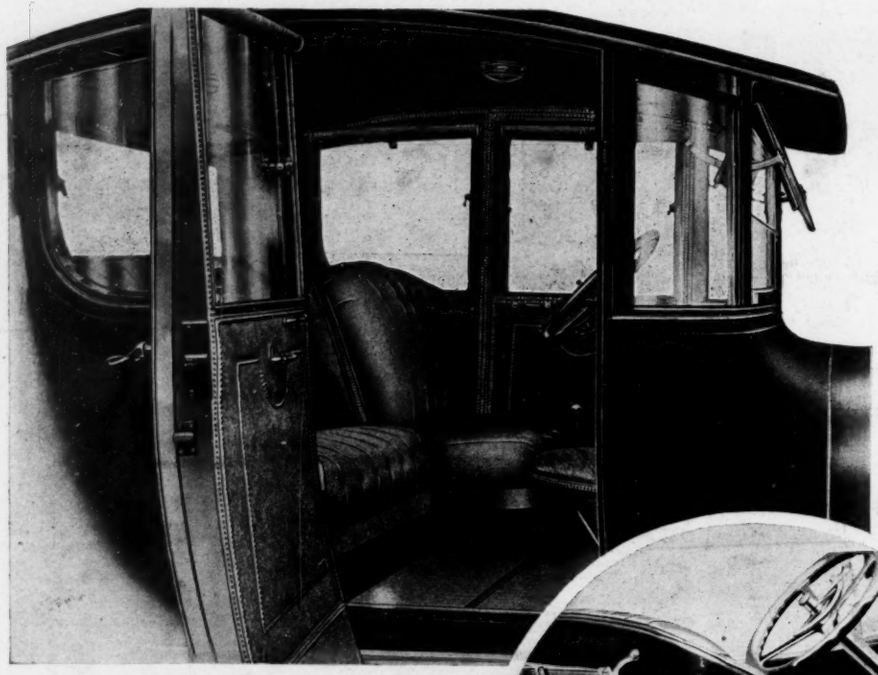




the design of the fabric itself may contain the contrast of color or shade. If the buyer likes strong contrast, he can get it in the black and white of strongest contrast, but even then he will find the lines and contours of the upholstery and plane surfaces of the interior in their simplest aspects.

The beauty includes comfort also. Perhaps the theory is that to enjoy beauty one must be comfortable, for soft lights, speaking tubes, clocks, smoking sets, vanity cases, dainty silk curtains, heavy floor carpets, wide foot rests, silk cord robe rails and heating apparatus are considered in the decoration. Dome lights with frosted glass give forth a vapor of light that has no shadows. The electric chophone either is attached to a cord that winds automatically out of the way or fits into an unobtrusive pocket. The clock is set flush with the upholstery of the wall or is a part of the toilette case so indispensable to the inclosed car. So eager is the decorator to provide for whosoever may ride within that a smoking set may occupy a recess in one side opposite to the vanity, or toilette, case in the recess in the other side. Silk curtains roll up or are hooked out of the way. The floor feels as soft as those at home. Footstools and rubber cushions underneath the carpet often take the place of the metal rail. Evening dress for the inclosed car only harmonizes with the rest of the interior, since provisions for heating have been made.

The shiny metal trimmings associated by so many unfortunates with the profession of dentistry have been surrendered to antiquity for the most part. The necessary exponents of the profession have been flattened into more seemly obscurity, and some makers have found it possible to give to them a different tint of

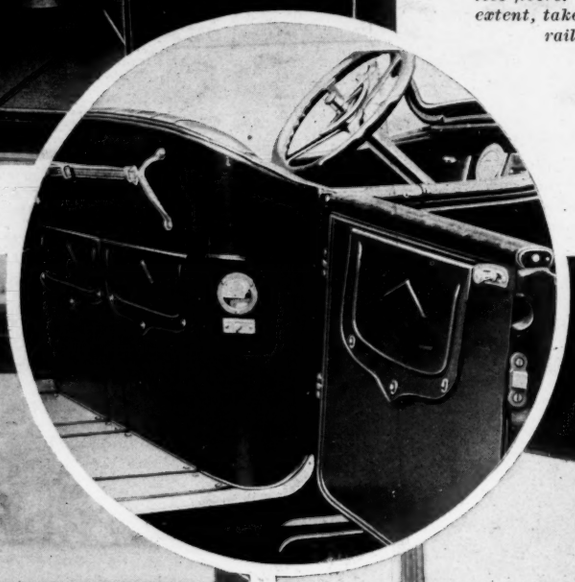


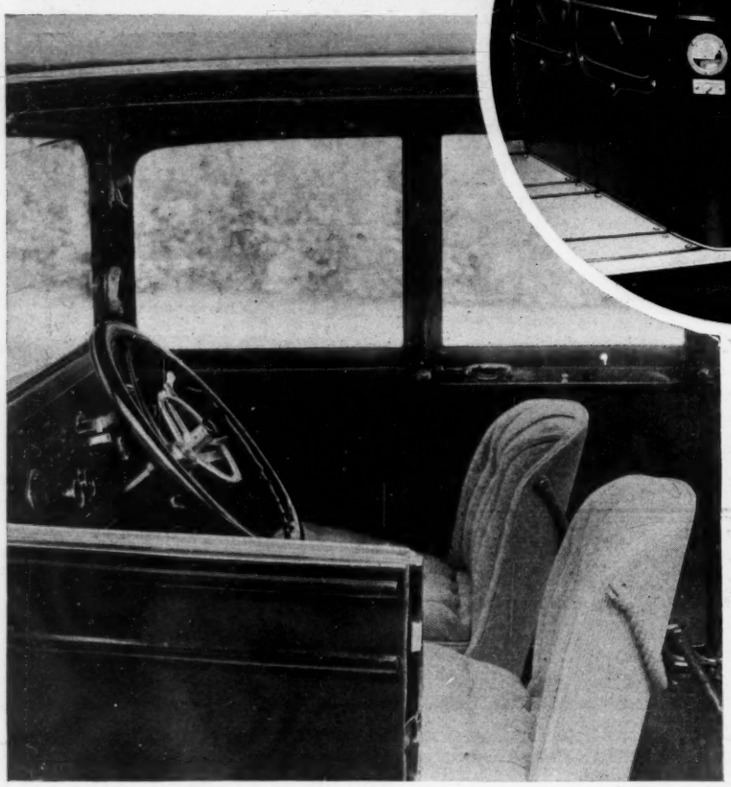
The Mitchell, upper left, has an extra seat that fits easily into the general scheme of decoration. The roll curtains make it possible to counteract the windowed sides when so desired

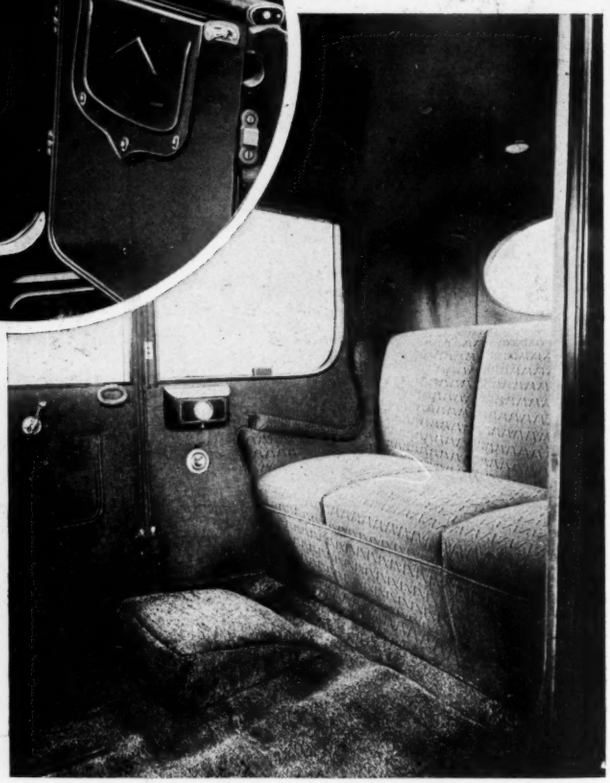
In the circle is the Olds, which, though not an inclosed model, shows a detail thought by many to be part of the new decoration. This is the light for the steps into the tonneau

The Paige, lower left, uses a whipcord material that gives better resistance to soft silks and velvets that may occupy its seats. Notice the staggered arrangement of these, the front, seats, and the individual cord robe rails

The design adopted by the White in this model reminds us of the original American, the Indian. The walls and ceiling are in a plain material, while the floor and hassock covering are of deepply material such as is found on noiseless floors. The hassock has, to a large extent, taken the place of the metal foot rail so long the standard



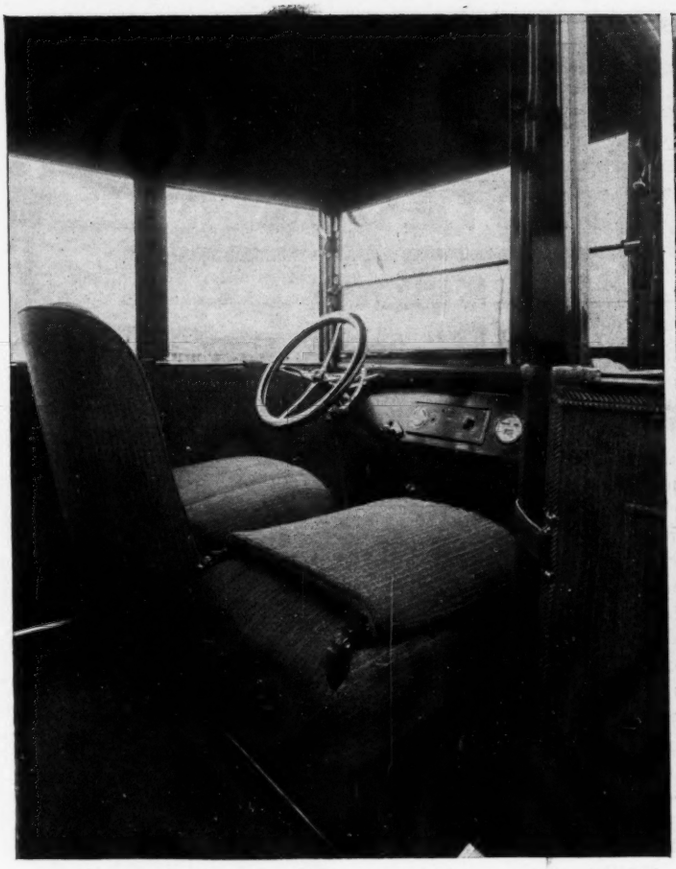




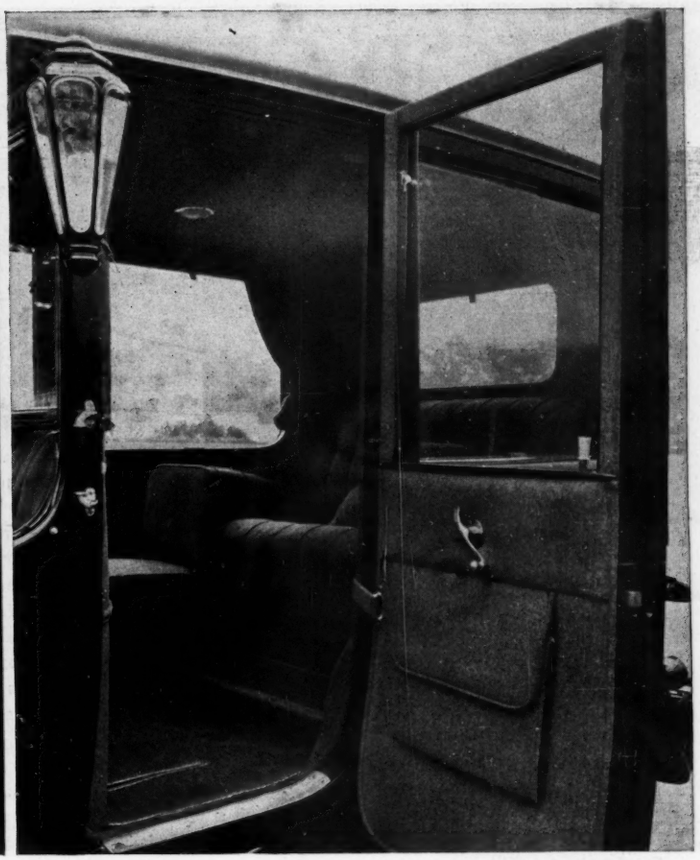
metal so that they become only notes in the general effect. As an aid to this happy accomplishment the indirect lighting system has been adopted, thus doing away with much metal. In some jobs no metal whatever shows. The frosted glass alone is visible, and as this glass is most likely to be Tiffany glass the effect is by no means unpleasing.

The lighting of the interior has received much thought. Windows of unusual and quaint design give more room for variety in decoration and the method of artificial lighting adds variety. Formerly one forgot how to read, apparently, when one stepped into the car, were it limousine, touring car, roadster or other type. But that belongs to the pioneering days. The corner holds the reading light when all else has been erased from its smoothly curved surface. The Pullman type of pull-out and push-in is at home in the interior of the inclosed car, and with the several dome lights in the ceiling the light is better in few other environments. Some fine filigree work is produced for the lights during the process of decoration. A dull finish that needs only an occasional touch of the cloth helps the effect of simplicity.

Chalmers leaves the problems of its interiors to Lady Duff-Gordon. She selects the textures, silk window draperies, carpets and upholstery, and the result is such as is to be expected from the creator of Lucille garments, an interior of more than credit to the new curves and streamlines of the modern car exterior.



This Maxwell rather prides itself on the folding front seat, but the upholstery and trim also deserve attention. This interior should not only have a simple and dignified look, but a business air, judging from that part shown. The carpet here is of different stuff and shade



The lamp just without the door of the Peerless attracts enroute within, and the interior seems able to take care of the rest. Silk curtains hook in place here instead of rolling. The interior is amply lighted by the windows in daytime and overhead lamps at night

She makes use of the many colors in this the renaissance of varitinted tapestries and brocades. Grays are favored, the rich pearl being her chosen keynote for the stripes, checks and plaids used in the Chalmers inclosed cars. She selects black and white Bedford cloth and Versailles buff for the sedan, though the buyer is offered a list of specials that includes many tapestries, brocades and broadcloths. A tan upholstery with pale rose figures is used often, other favorites of this interior decorator being a brocade in silver or tan and a deep Lincoln check on a tan background.

Choice is always open, however, for that matter. Many of the interior decorators proper stand ready and willing to suggest or select fittings for the inclosed car. Miss Elsie De Wolfe is one of the decorators who suggests and selects. As in her other decoration simplicity is the keynote most emphasized. Upholstery of her approval contains no tufts whatever. A smooth finished material of solid color probably would be selected by her most readily from a display of many varieties. Contrast depends on the toilette case, which is of simple design and of inlaid wood, and other quiet fittings. In her own car the plane surfaces are unbroken with few exceptions. Even the dome lights are flush with the ceiling.

Buyer Has Chance to Choose

Whipcord still remains the standby for cloth upholstery, though other cloths are very popular. French railroad cloth, broadcloth, uncut mohair, Bedford cloth, solid colors, striped cloths in gray, gray blue, tans and browns, tapestry cloths and velvets for luxury—these are some of them. A hair line stripe in a smooth cloth is recommended for service. The solid colors are used for the town cars most often. In any case the question of the use to which the job is to be put is a factor in deciding the interior decoration.

The little things that count also are considered. For instance, Ben Hur provides a gusset pocket in the back of each front seat for rubbers and Hudson has arm slings in its inclosed cars, while Allen leaves 6 in. between the rear seat and wall as room for hats that project over the back of the seat. Many other makers observe these or other little courtesies. A few are illustrated here, but it is only to begin to call the roll since interior decoration of the inclosed car acquired the potency it now has. The glass windows, to give yet another instance, often are not held in a frame, so that the view will not be obstructed by a black band on top of the lowered window when it is adjusted for ventilation.

Rear and rear side windows are larger than of old. They work into the interior scheme better, besides improving the lighting. Automatic window lifts usually furnish means of adjustment for the door windows and, in some jobs, those between the driver's seat and the passengers' compartment. Seats are designed for both beauty and comfort and are inclined to conform to the figure. Cloth-covered rattan molding has to a certain extent supplanted upholstery braids, making a simpler finish. Automatic step lights assist entrance. A mat may precede the door.

Each Interior Planned with Care

Hat and luggage racks, coat hooks, umbrella holders, bouquet holder and other fittings follow the general trend to make every accessory as unobtrusive as possible. Each maker studies a scheme whereby he can supply them and yet keep the interior of the car simple. Auxiliary seats fold into partitions when not in use, leaving behind them little trace, a few lines in the carpet being sole evidence of their availability. If the inclosed car is such by reason of the winter top, the lines of junction blend with the smoothness and neatness made possible only by special designing. Many of the makers have adopted the custom, in fact, of making each inclosed car a more or less special job, and when the inclosed car becomes a special job, each interior is handled as an architect handles plans for a new house or an interior decorator follows a general plan for each room in relation to the whole building.

MOTOR GERMS WEEDED OUT

By DOCTOR DESIGNER

As Told By W. B. BLOOD

GREAT things have been going on in the designing laboratories of the motor car factories during the last year. All appearances go to show that the tendency is toward perfection of the present design of motors rather than anything radically new in mechanical principles.

Those things which have most recently confronted the car builders in the last year are: Efficient carburetion with the inferior grade of available fuel, reduction of every ounce of weight where it is not needed, relieving the motor of superfluous parts on the outside and sealing up places where there is a possibility of oil leak, cleaning up cylinder interiors and using metals to which carbon will not adhere, improving motor acceleration, and constructing every part with a view of miserly economy in fuel consumption.

The medical profession is constantly divulging new means of adding on and taking off parts of the human body with the object in view of increasing its present and future efficiency. So in motor designing we have skin grafting and a wanton removal of parts equally as superfluous as the human tonsils and appendix. Where metal is not needed the motor gets the obesity cure. How many of those who are termed "fat and forty" would not vibrate with joy could they remove the import of the first word by such a simple device as a milling machine?

ELIMINATING THROAT TROUBLE

MOTOR car engine designers have striven so to design the carburetion parts of their motors as to deliver a heavier charge of fuel into the cylinders than was heretofore considered necessary and at the same time build this gas out of a very poor grade of so-called gasoline. This dual effort is evident in every motor car engine of 1916. Some makers, whose motors had not been changed for a number of years and were considered satisfactory for a good many years more, were obliged to alter the carburetion system to take care of this unexpected dearth of anything that might be called real gasoline. The present grade of fuel is surely but little removed from coal oil itself.

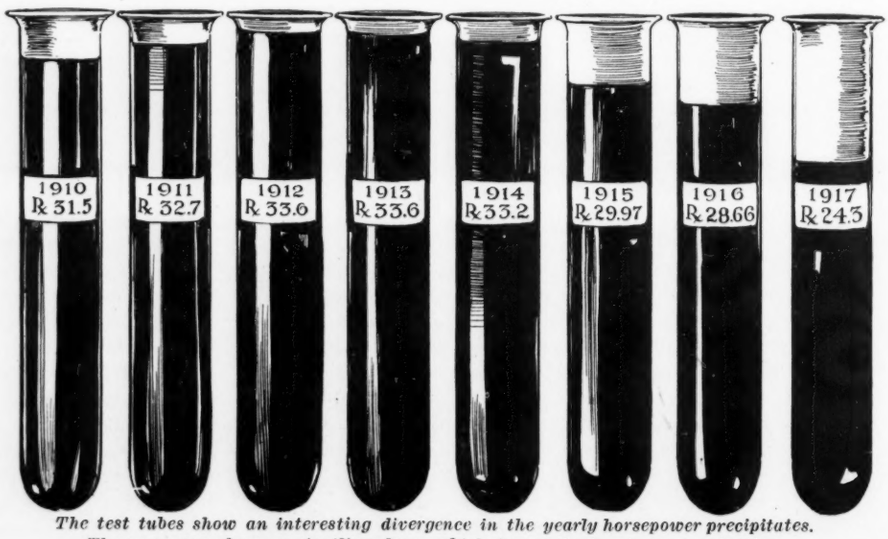
The various methods that have been adopted to deliver more fuel to the motor and to get a charge into the cylinders within a reasonable time when the motor is cold presents an interesting story indeed.

A summary of the features which are created to give better carburetion might be summed up under the following heads: Better carbureters which provide proper fuel mixtures at various speeds, shorter and cleaner intake manifolds, and higher temperature in the intake manifolds.

The carbureter's part in delivering the proper mixture to the motor seems to be a matter of debate. Some engineers contend that the latest carbureter models are the maximum of perfection and the intake facilities are what need attention and others claim that the carbureters are not so designed as to properly compensate the mixture for the demands that are created at various speeds. At any rate the carbureter makers are striving towards the perfect automatic compensation instrument and the engine designers are providing various means to get the gases to the cylinders in a state which approximates as nearly as possible the state in which they leave the carbureter.

The result is shorter manifolds and clean passages. Square corners in manifolds are becoming a thing of the past and some designers are getting into the finer points of slanting the passages which lead into the motors to eliminate any pockets in which the gasoline may collect. It is not unusual to find manifolds which are machined on the interior.

Although there is little tendency to increase the valve sizes, it remains that three makers, two of them listed among the early producers of motor cars, White and Stutz, have introduced sixteen-valve motors to increase the valve area and better distribute the incoming gases through the cylinder interior and give freer discharge of the exhaust. The matter of bringing the cylinders closer together has a great deal to do with shortening the manifolds. Figures



The test tubes show an interesting divergence in the yearly horsepower precipitates. The new year shows a startling drop, which is prophetic of more reduction

show that three-quarters of all 1917 models have motors with block-cast cylinders.

In a great many cases in new motors the intake manifold is cast integral with the cylinders. The advantage of this in heating the gases is apparent.

The matter of heating the manifold is handled exteriorly in a good many modifications. Some designs incorporate a stove cast into the exhaust manifold which provides hot air for the carbureter air intake. Others have attached stoves with solid and flexible piping to the air intake. In a number of cases the manifold is jacketed with hot water. An interesting application of this is found in the new Packard. The entire supply of hot water going to the radiator first passes around the intake manifold. Several makers utilize both hot-water jacketing of the manifold and hot-air piping to the carbureter air intake. All of this is designed to bring the gas passages up to the proper heat in the quickest time.

Thermostatic equipment is found on several of the high-priced cars. Cadillac still uses it. Pathfinder has installed it on the new chassis. Hudson gains the regulation of the water temperature through a different means. A shutter is attached to the front of the radiator and this shutter is regulated from the driver's compartment. A Boyce Moto-Meter is an essential in this extra equipment.

THE CURE FOR OBESITY

HEAT-TREATING ovens calibrated to the fraction of a degree, an endless list of experiments in metal composition, in fact the finest points in the art of metallurgy have developed steels and alloys for use in motor car motors which reduce superfluous weight to a surprising degree.

Of course, the greatest interest in this regard centers around the use of aluminum alloy in piston construction. Although the use of aluminum in pistons has not greatly increased, those who have adopted it are adhering to it. The first drawback in the use of aluminum as a piston metal, that of its expanding and contracting proclivities, is now about ironed out by scientific application of piston rings and provisions for draining the oil from the piston skirt. The Oldsmobile eight has a new type of piston in which a number of holes are drilled about the lower surface to drain out the oil which collects between the pistons and cylinders.

Connecting rods have figured in on the weight reduction. Studebaker connecting rods are several ounces lighter in weight. This reduction is being gained by machining off to a matter of thousandths of inches what stock is on the connecting rods which does not serve to maintain the maximum strength. Combined lightening of pistons and connecting rods has its incidental advantage, however, in reducing the aggregate car weight. The big reason for this cutting down is to lighten the reciprocating parts, thus creating a more flexible, more vibrationless and all-in-all a more powerful motor.

The use of aluminum crankcases seems to be at a standstill. In some instances even, aluminum crankcases have been discarded in favor of pressed steel. This does not mean an increase in weight, however. An aluminum crankcase and a pressed-steel crankcase come very near centering the balances. The advantage is in lower cost and cleaner appearance. No one will discount the statement that a smooth pressed-steel case is more sightly than a cast one.

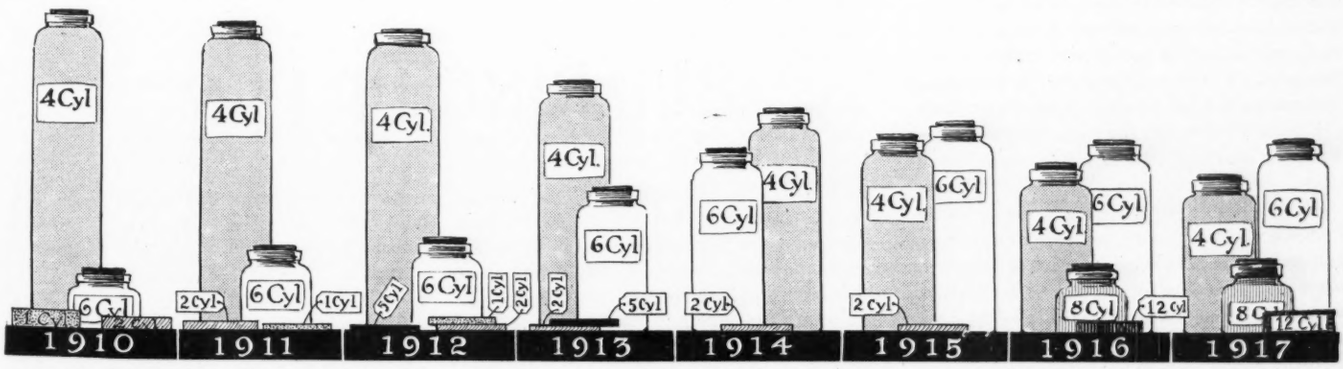
The use of aluminum as a material for cylinder blocks is slowly gaining prestige. Of course, this construction is still maintained by Marmon. Inasmuch as aluminum is not a fit metal for cylinder interiors the use of cast-iron cylinders fitted into a bore hole in the aluminum-cylinder block gives the proper bearing surface. It is hardly necessary to say that a motor with aluminum cylinder blocks is a great deal lighter than a cast iron one when it is considered that it takes a lot of metal to make up the water compartments, etc.

Think back several years and picture to yourself the parts that went into the make-up of what were purported to be passenger-car engines. They had a bore the size of a howitzer. The pistons gained their strength through sheer massiveness rather than through scientific placing of light ribs and reinforcements. The connecting rods looked like bridge beams. There were cast-iron crankcases so heavy that two or three men had to hold them up when they were being bolted on.

The new motor car engine and the old are as different as a racing stallion and a truck horse. The public has taken this remarkable development complacently, probably because, when the hood is opened the new motor looks little different than the old. The results are in your gasoline bills and in the quick get-away and flexibility that you have been crying for, Mr. Owner.

CLEANLINESS A VIRTUE

THE exteriors of motors have been undergoing a slow process of cleaning up for a number of years. The particular application of this in the new year concerns the twin motors. It is a peculiar proverb of invention that anything mechanical—generally speaking—appears first in its most complicated and cumbersome form and after months of combing approaches the simplicity and accessible state where it should be. Although this is not true of all eight- and twelve-cylinder motors it is to a majority of them, especially to the pioneers who really did the experimental work and perfected products which have been more or less copied by the new-



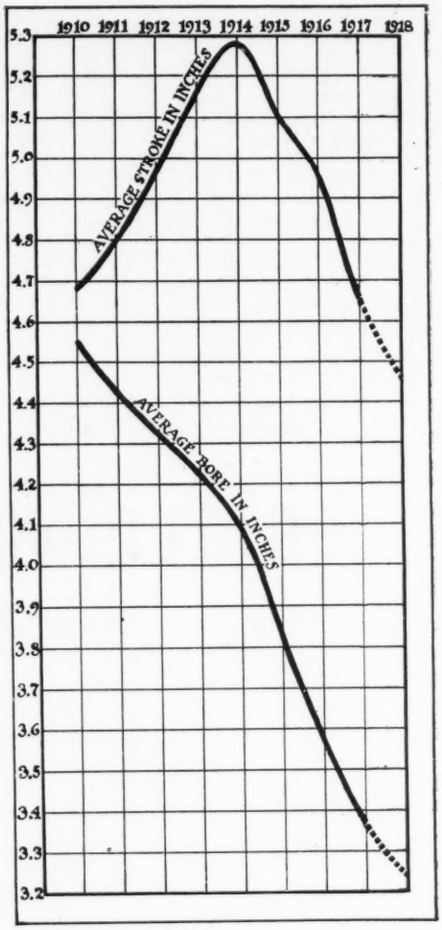
Dr. Designer's specimen case, showing cylinder specifics used from 1910 to 1917. One-, two- and five-cylinder motors, like alcohol and paregoric, are now cast out and we have the more scientific eights and twelves, the old reliable sixes, and the great old home remedy—fours. The bottle sizes are proportionate to yearly chassis model construction in the various numbers

comers. Perfection is little credit to the copier and much to the pioneer.

Whereas twin motors of the early designs had a regular labyrinth of accessories in the shape of bulky carbureters, fat intake manifolds, generators, magnetos and what not between the Vs, the present tendency is to clean out this space as much as possible. It is no longer a pocket into which accessories are dumped.

Overhead-valve construction is appearing in twin motors more than ever. One reason for this, of course, is that the designer of that motor believes this type to be superior. Another good reason, however, is that the valves are accessible as they cannot possibly be when placed in L-head fashion on the inside of the V. It is seldom now that one finds a V-motor in which the carbureter adjustments are down in what seems to be a bottomless pit to the man who is endeavoring to adjust the instrument. They are well up where they can be easily reached.

Casting intake and exhaust manifolds into the cylinder blocks in all types of motors is having a great deal to do with cleaning up the exterior. This is nothing new, but is surely getting more following every year. The complicated appearing pipes which look as though they were put on the motors as an afterthought are rapidly disappearing. Let it not be understood, however, that a motor with outside manifolds is necessarily any less efficient than one with them cast integral. The adherents of exterior manifolds believe them to be efficient or they would not use them. Another item of cleanliness which is a matter of dirt rather than of distribution of parts, is in so choking or locating the crankcase breather that it will not spray a film of oil all over the hood interior. A particular meritorious disposition of the breather is found in the Dorris. The tube opens directly into the inclosed overhead-valve compartment, so that the oil vapor not only stays away from the motor exterior, but assists in lubrication of the overhead valves.



Bore and stroke curves are still descending. Our last year's bore prophecy exactly hit the mark. Will it hold true once more?

REMEDYING THAT TIRED FEELING

MUCH has been done in a number of ways to reduce the fatigue limit of the motor as a whole. Things which, in previous years, contributed to the short life of motor car engines were excessive weight of parts, very poorly balanced crankshafts, heavy pistons and connecting rods, and rough surfaces in the combustion chamber. Another big factor was the fact that, because of the youth of the industry, metallurgists had not developed alloys in metals to meet the particular requirements of each part in the motor.

This matter of alloy metals is one of the blind developments in the motor car industry. The general public hears of the tendencies toward streamline bodies, double cowls, aluminum pistons, smaller bore and stroke, etc., but this vast stride in the industries does not reach the ears of the populace because motor car engineers seem to think the ordinary man does not care whether his connecting rods have nickel in them or vanadium as long as they keep on going up and down. This is not the case. The motoring public is becoming educated in a surprising degree and they are beginning to ask for those specifications which, a year or two ago were considered deep.

It is coming to the point now where every metal part in the motor car, no matter how small, must be constituted of a material treated after a prescribed formula which fits that particular part. This is a matter of percentages of the amount of carbon, nickle, manganese, silicon, sulphur, etc., and the heat treating process which involves a prescribed amount of heat, up around 1500 deg. Fahrenheit, and a definite process of quenching, etc.

As has been previously stated the parts have figured in on a sweeping weight reduction. The strain on the bearings is surely a great deal less than it was in the days of cast connecting rods and stationary engine pistons.

A motor which does not vibrate is obviously going to have a much longer term of life than one which throbs and shakes itself to death from improper balance. There are very, very few manufacturers offering cars for 1917 delivery having motors which are not provided with some method of counterbalancing the reciprocating action of the pistons and connecting rods. Hudson was one of the pioneers in this principle and has brought out some surprising performances with its super-six motor.

A motor which carbons freely is not as long-lived as one which remains clean. Another advantage of aluminum is that it has little affinity for carbon. Thus, aluminum pistons remain comparatively clean for a long period. Combustion chambers are being machined out to a smooth finish by many manufacturers and this slippery surface makes a poor resting place for the ever-present black soot which oil and gasoline makers cannot eliminate.

Because of the rapid strides in the development of special machinery we are getting motors which are machined down to a much finer point than they used to be.

BUILDING UP PEP

ACCELERATION, the kind that makes the rear of the seat hit you in the back when you step on the throttle, is being demanded by car purchasers and consequently supplied by car manufacturers. This snap and vigor in the powerplant is brought about in a vast number of ways and contributing factors are found throughout the chassis from the front axle to the rear.

At first impression it might seem contrary to reason that a very much smaller motor than was built say four years ago can give a car of the same weight about twice the accelerating ability. The fact develops here that the small motor is capable of a thousand or maybe more revolutions in each minute and because of this it is quite possible to step down the gear ratio. A car of four years ago with the old slow

speed plugger of a motor might be developing an r.p.m. of around 1000 and drive the car faster than the speed limit allowed, while the present-day motor, turning at the same speed would be giving the car a leisurely sight-seeing pace. It is this factor more than any other that is giving the car more pep, more get-up-and-get.

It is possibly varying from a motor story to discuss gear ratios, but the affinity of this factor with motor speed, makes a few figures permissible. In 1912 the average gear ratio on high was 3.62 to 1, in 1913 3.57 to 1, in 1914 3.6 to 1, in 1915 3.88 to 1, in 1916 4.08 to 1, and now in the new year we have an average of 4.15 to 1. Our motors are going faster and the flexibility is stepping up, so that we have surprising power performance in such small motors.

Let's have another list of figures to show how the motors are growing smaller. This regards piston displacement: 316.2 in 1912, 345 in 1913, 349 in 1914, 307.38 in 1915, 278.87 in 1916 and 222.5 in 1917.

Of course a big contributing factor to rapid acceleration of the motor is lightness of reciprocating parts, which has been previously discussed. Another important item is that the amount of charge taken into the cylinder at each stroke is considerably more than it used to be. The actual way in which this has been accomplished is in the smoothing out of the intake passages, previously described.

BETTER ASSIMILATION

ECONOMY! Prices are going up. A man is paying more for his car, and for that very reason wants it to operate more economically to pay for the difference in price caused by the high cost of materials and labor. Gasoline is higher by double in a good many localities than it was a year and a half ago. Economy in a motor car means small gasoline consumption. The motor and its accessories shoulder the responsibility.

It is very much easier to say what has not been done to give economical operation to the motor than what has been done, as there is practically no part which has not received consideration with this one idea in view.

If a certain quantity of gasoline could be delivered to the carbureter, converted into a mixture of air and gasoline vapor, passed through the manifold and valves and exploded in the motor without the loss of a speck of gasoline we would have a very nearly ideal motor. This end can probably never be reached, but it is a goal and the designers are using it as a guiding star.

The carbureter has much to do with it but by no means all. As previously mentioned the new instruments on the market are planned to give the correct proportionate mixture of gasoline vapor at all speeds. Be it known that the demands of a motor at varying speeds are greatly different as far as mixture is concerned. A sharp-cornerless manifold with a smooth interior helps to allow passage of the full charge to the motor. Large valves help to get it all into the cylinders, and valves located near the center of the combustion chamber help to distribute the gas rapidly and where it is needed, ready for the explosion. A hot spark serves to ignite that gas quickly and ample-sized exhaust valves, properly located, give the gas a final shove and practically get it all out and into the muffller, although theoretically there is some which does not find an exit.

The matter of small bore with proportionate large power brought about by the factors previously discussed, has its effect in motor economy. It is surely reasonable to assume that a smaller combustion chamber takes less gasoline. Condensation in the manifold is reduced by hot water or hot-air jacketing. All these factors have received diligent attention in the hands of the designers and contribute to make far more economical cars than we ever had before.

This has been a year of surprising interest in the subject of kerosene carburetion. MOTOR AGE receives many inquiries from its subscribers asking whether the motor car engineers are pure boneheads or if they are spending so much of their time on getting out cars to supply the demand that they are forgetting that the public wants a successful kerosene operating motor.

There has been a great deal done which the public knows nothing about. The day is coming when a low-grade fuel will be used successfully. There has been one big stumbling block in the way of this and that is the matter of heating this low-grade fuel so that it will vaporize. On par with this is the fact that it is hard to start a car in cold weather with gasoline as a fuel, and with a less volatile explosive the trouble is naturally much greater.

PERFECT MOTOR PHYSIQUE

IN MEMORIAM to the low speed, overweighted, unbalanced, and unsightly motor of the past years which had the apparent complexity of a linotype machine and the sluggish action of the proverbial slow train through Arkansas.

The question is, what are we going to have? First of all we will have fours. Prophesies of bygone years that the four would practically leave our midst in favor of the purring twins has been dispelled. This is sharply brought out in the 1916 announcement of Buick's return to the four-cylinder fold. We will have sixes, eights and twelves. We will have Knight sleeve-valve motors. The Willys-Knight is selling in large quantities and will continue to.

But the question is, what is to come? It might be assumed that we will have successful rotary valve motors. Heretofore this type has been taboo because the rotary valve could not be properly oiled, and there have been many other drawbacks. We may have successful two-cycle motors, in fact the writer of this article saw a two-cycle motor the other day which will idle down close to 100 r.p.m. and hit evenly on every cylinder. This has been the two-cycle drawback heretofore. Its flexibility in comparison with the number of cylinders is unquestioned.

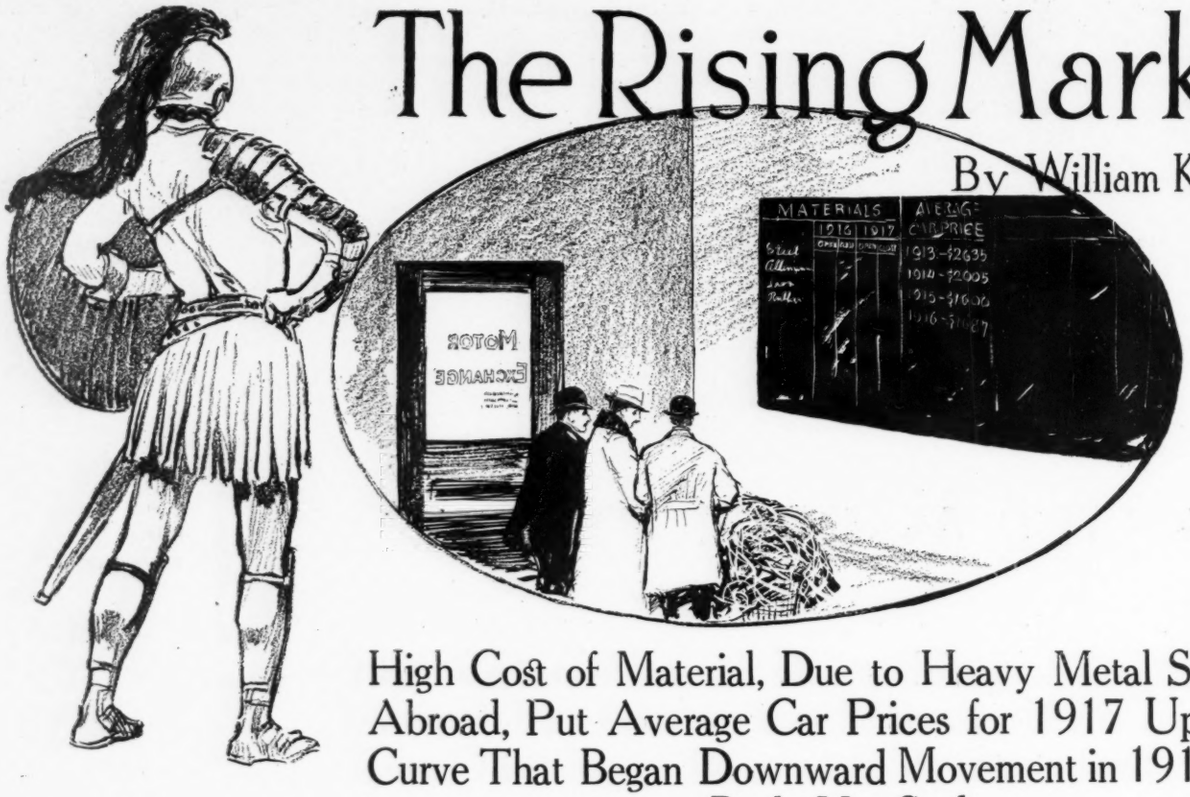
The question of sixteen-valve construction is stirring up unusual interest because of its recent adoption by two big makers. At any rate valves are going to be better located. Gases are going to be introduced into the cylinders at a point where they will be evenly and immediately distributed throughout the cylinder.

I was going to say that kerosene-burning motors may come. They are here. It will not be long before anyone who desires a Ford equipped with a kerosene carbureter may have one by specifying that it be so equipped at the factory or factory distributing station. Innumerable tractors are burning kerosene and are getting away with it in fine style. There is not a whole lot of difference in a tractor motor and a passenger car motor. It is a matter of speed of piston travel and weight of reciprocating parts more than anything else.

The bore and stroke are still on the downward slope as far as size are concerned. What are going to be the figures another year? A majority of the newest creations have motors of piston displacement in the neighborhood of 200 cu. in. In the curve showing the bore and stroke averages of a year ago the prophetic continuation of the bore curve for 1917 hit the mark almost exactly. In the stroke curve we did not step down far enough. Is it reasonable to suppose that the limit has been reached? It is a prophesy that another year will show one more general slash in the average size of piston displacement. There are going to be some remarkable developments in economy.

The Rising Market

By William K Gibbs



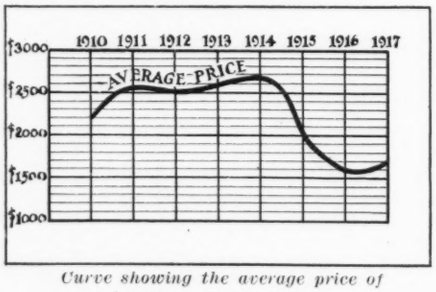
High Cost of Material, Due to Heavy Metal Shipments Abroad, Put Average Car Prices for 1917 Up $87—Curve That Began Downward Movement in 1914 Starts Back Up Scale

FLUCTUATIONS in the value of stocks seem to find a parallel in the selling prices of motor cars. Reading the tape that tells you, Mr. Consumer, what changes have taken place in car prices since the exchange closed on 1916 and opened on the morning of announcement for 1917 car models, shows that stock to have gone up eighty-seven points—a point in this instance being a dollar. Last year you were able to buy cars at an average price of $1600 flat, but if you buy now you must pay an average price of $1687. Again, it may be wise to buy early for few manufacturers are willing to assure you that a higher average price will not come until a new issue of cars comes onto the market.

Bulls vs. Bears

Last year you were a bull; now you are a bear in the parlance of the stock exchange. It is hardly likely that you will become a bull in the very near future, all congressional and cabinet leaks that have developed in the last fortnight, notwithstanding. The motor car market is fairly stable. Flurries do not come over night. Last year it was a process of greater production that lowered the average price of cars to $1600 after an average of $2005 had been established in 1915. The season before us—1917—offers an entirely different reason, which is that the cost of materials entering into car construction—almost all of the many component parts are affected—cannot be bought for anything like the price that prevailed even a year ago.

You are not to understand from this that production has not forged ahead. It has. If it were not for the fact that production has forged ahead the increases necessary to offset the higher cost of material would be much in excess of the present figures. When it comes to increases in price of motor cars one naturally ex-



Curve showing the average price of American cars for 8 years

pects, or at least should expect these to be in units of $50, $75 or $100, when consideration is taken of the ratio of percentages in increase of almost every other commodity today, yet from the increases announced so far it seems evident that the car manufacturers are taxing the consumer as little as is consistent with a reasonable margin of profit, and are content with adding just what the extra cost is to them, since one increase is as low as $10 and others are $15, $35, $40, $55, etc.

Practically all of the manufacturers who have announced increases, either now or to become effective in the early winter, that are in excess of $200, could be counted on one's fingers, the majority of the increases not being in excess of $100. Nineteen-fifteen developed the fact that the average price of cars, taking the touring car as an average car, was $2005. Then 1916 showed a big drop in average price —$405.

Machinations of Moloch, since July, 1914, which have made millionaires and paupers of Americans with greater rapidity than any one factor in the history of the world, is wholly responsible for the increase in the cost of car-making material. All metals that find place in motor car construction are higher than at any time since motor vehicles made their bow to the world. It would be difficult to conceive why prices on cars have not gone farther skyward were it not for one thing —greater production.

Greater Production

Throughout the entire organization of each car factory everyone has endeavored to work toward a higher grade product with as little additional cost to the car buyer as possible. Makers have not been blinded by the thought of maintaining a price that would be the same as last year's at a sacrifice of quality, for every car maker knows that the product must be kept at a high standard, or made somewhat better than the preceding model to maintain sales.

The elasticity of the dollar is considerably more reduced as the 1917 season opens than was the case at the beginning of 1916. The dollar's present purchasing

power is considerably below the par established a year ago, yet the product of the car factories has been enhanced in value by the additional research and experiment conducted in the twelve-month. When you sit behind the wheel of a 1917 model and begin your annual drive, you will find you have better value than you had in the beginning of 1916, even though you did have to dig down a little deeper into the bank account than you figured you would. When you discover that, perhaps the additional cost will not be a disturbing factor in your mind.

Looking back over the span of motordom, one fact stands out prominently. The present popular-priced car, and by that I mean those listing from $900 to $1500, if put in the scales of average with a car costing four or five times as much five or six years ago, the balance would almost invariably be in favor of the newer creation. The high-priced car of 1917 and the car of equal price half a decade ago have little in common. We have only to look at the $5000 car, or one of higher price to-day to know why the price is that high and it can truthfully be said that the high-priced car of 1917 is correspondingly better in the same ratio that the present popular-priced vehicle bears toward the highest-priced car of five years ago.

More Cars Under $1000

Even though you have been told that the average price of 1917 cars is higher than the average for 1916, there is no cause for alarm, and you who have hoarded your loose change with the idea in mind of sporting a new model during the early spring will have plenty of cars to choose from, in fact, there are more listing under the $1000-mark than there were a year ago. For 1917 there are sixty-five models in four-cylinder cars and twelve six-cylinder models from which to make a choice. Last year there were only forty-nine fours and eleven sixes.

The lowest-priced four is the Ford roadster, which held the low hand so far as price was concerned a year ago, yet this year the Ford is one of the few cars on which the price is lower, and this with a decided improvement in appearance. The Ford touring car and the Emerson four are the only others that list under $400. Saxon and Chevrolet are the only two fours in the range from $400 to $500. Nine models of fours are found in the class from $500 to $600; eleven from $600 to $700; twelve from $700 to $800; nineteen from $800 to $900, and eight from $900 to $985. The lowest-priced six is the Grant at $825 and this same car with another body type heads the $1000-list of sixes.

The loss in the number of four-cylinder chassis seems to be the gain of the sixes, since 37 per cent of all chassis models are four-cylinder as against 39 per cent in 1916, whereas the percentage of sixes for 1917 is 47, compared with 45.8 per cent in 1916. Eights have dropped off slightly and twelves have nearly doubled, although for 1917 their percentage of the whole number of chassis is but 4. The highest-priced eight is the Cunningham, at $5250, and the lowest, the Homer-Laughlin front-drive car, which lists at $1250. Enger still can boast of the lowest-priced twelve at $1295, although this represents a raise of $200 since last year. The Austin Highway King is the highest-priced twelve, listing at $5250, and it remains for the four-cylinder car to top the list for 1917 with a crown of $9000, which is the tidy price asked for the F. R. P. 45 with Victoria top.

Getting down to some actual increases in prices and being specific: Dort raised its price $30, Ross $200, Chevrolet $50 on the Baby Grand and 185 on the eight-cylinder touring, Daniels $200, Chalmers $70 on the seven-passenger touring, $90 on the sedan, $70 on the town car and limousine and $100 on the 6-30; Pullman $85, King $50, Packard $185 on the model 225 and $235 on the model 235, Marmon 34 $115, Kissel made increases in all models ranging from $90 to $115, McFarlan raised $300, Winton $200, Saxon $50, Premier $200 to $215, Allen $100 on all closed cars, Mitchell $100, Cadillac $160, Austin $350 to $600, Buick D-4-34 and D-4-35 $10, D-6-44 $55, D-6-45 $50, D-6-46 $15, D-6-47 $35; Maxwell touring car and roadster $40, Franklin $100 on all models, Standard $100 on all models, Auburn six $60, King seven and four-passenger touring cars and roadster $185 and seven-passenger sedan $200, Paige 39 $85, 51 $120 and 39 $105, Studebaker $25 to $30, Pathfinder touring $275 and roadster $425, Lozier $100, Argo $20, Hudson $275, Velie $50, Regal $50, Oakland 34 $30, Detroiter $100, Briscoe 4-24 $60, Hal touring and roadster $215, sedan $60, Hal touring and roadster $215, sedan, limousine and brougham $250; Cameron $165, Haynes $100, Jeffery $100, Peerless $90 on all models, Abbott $100 on all models, Stearns eight $100 and four $45, Cunningham $250 on all models.

FOURS AND SIXES UNDER $1000

SIXES

Grant, K	$1,000
Monitor, O	995
Monitor, M	995
Chicago, 6-40	985
Elgin	985
Lambert, 80	985
Grant	960
Overland, 85	925
Hollier, 186	895
Oakland, 34	875
Saxon, S-4	865
Grant, K	825

FOURS

Car and Model	Price
Kent, A	$985
Maxwell, 25	985
Monroe, M-4	985
Monroe, M-3	965
Empire, 45	960
Dodge	950
Studebaker, 4-40	940
Studebaker, 4-40	930
Inter-State, T	895
Laurel, 35	895
Hackett, 4	888
Classic, 4-40	885
Laurel, 35	885
Bell, 17	875
Reo, R	875
Hatfield	875
Maxwell, 25	865
Drexel, R-30-35	855
Allen, 37	850
Inter-State, T	850
Lambert, 90	850
Laurel, 35	850
Elcar, D	845
Pullman, 424-32	825
Briscoe	810
Chevrolet, F-2	800
Chevrolet, F-5	800
Crow-Elkhart, CE-35	795
Dixie Flyer	795
Monitor, C	795
Monitor, R	795
Napoleon, 30	795
Overland, 85-4	795
Dodge	785
Princess, 4-36 F	775
Ghent, 4-30	750
Harvard, 4-2 T	750
Richmond, 4-35	750
Dort, 9	695
Regal, 4-32	745
Maibohm, A	695
Overland	695
Partin-Palmer, 32	695
Briscoe, B A 24	685
Arbenz, D-4	675
Buick, D-4-35	675
Buick, D-4-34	660
Crowther, 5-03	650
Ford, T	645
Monroe, M-3	635
Ford, T	595
Harroun, A-1	595
Maxwell, 25	595
Maxwell, 25	580
Monroe, M-3	565
Moore, 30	550
Metz, 25	545
Partin-Palmer, 20	545
Ford, T	505
Saxon, B-5 R	495
Chevrolet, 4-90	490
Crowther	450
Emerson	395
Ford, T	360
Ford, T	345

Sales Over a Billion

It might not be amiss to tell in a story of this kind just what the industry did in 1916 in the way of sales. The year just closed was a record one so far as sales were concerned, the progress attained being as great as that of any other American industry. Retail sales of motor cars in 1916 were in excess of $1,000,000,000, and there is no indication that the demand for a reliable, service-giving, power-driven vehicle that has taken such an important place in the work of transporting rapidly and economically a big proportion of the citizens of this and other countries of the world, is nearing a decline.

Figures that are a veritable romance in business, and which show that the sales of last year exceeded 1,600,000 passenger and commercial vehicles, with a retail value of over a billion dollars, and an average price of approximately $672, make interesting study. The average price for passenger vehicles, considering the total volume sold, was $605, a little over one-third of the average price of each make of car produced.

It seems apparent that the real answer to the motor trade prosperity is the one magic word, "service." Just as long as the motor car can transport the individual or freight more rapidly and at a lower cost than any other type of vehicle, just so long will this country and the balance of the world scrape up its pennies and hoard them until they can buy some sort of a motor vehicle. There are types for the most fastidious—those who want all the luxuries of the king's equipage, or those who do not go in for pulchritude just as long as the particular vehicle their pocketbook lets them buy gets them to their destination on time and with a degree of comfort.

The Motor Follies of 1916

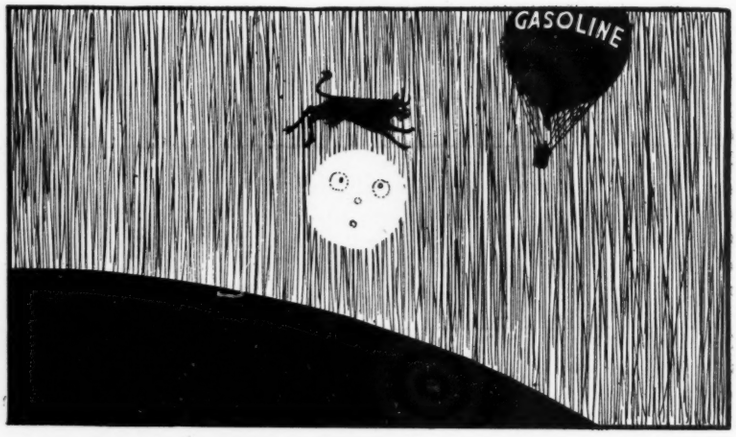
By J. C. Burton

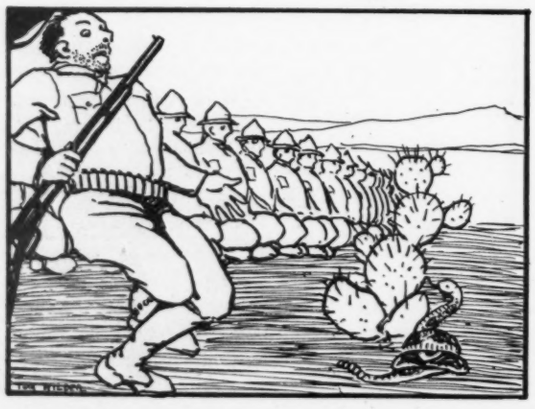
Introducing a Coney Island ballyhoo. Also the author's alibi.

This is but an introduction
To a big twelve scene production
That is absolutely new
In the way of a revue.
Ziegfeld, who is known as Flo,
Neither backed nor staged this show,
Yet our all-star cast and chorus
Get a stipend that will floor us.
Buy seats early, take no chances,
Or you'll miss the songs and dances,
Wit and satire fired in volleys.
Make way for the Motor Follies.

A court of bankruptcy. Short-measure gasoline tanks make merry in jury box as crowd of motorists, clothed in sack cloth and ashes, plead before Judge K. M. Landis.

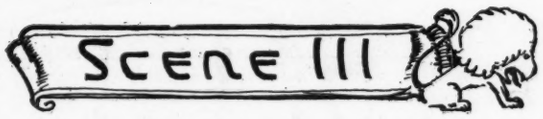
Motorists—Hey diddle diddle,
The cat and the fiddle,
The cow jumped over the moon.
This doesn't compare
With the flight in the air
Of the gasoline prices' balloon.
John D. may give thanks,
But we've robbed our kids' banks
To purchase a pint of rare stuff;
We squandered our treasure,
Got less than full measure,
Our lot is exceedingly tough.
The Judge— Enough!
Motorists— Our lot is exceedingly tough.
We're at the mercy of the court
While cheating gas tanks gayly chort.





On the Mexican border. At rise of curtain, standing army is seen sitting down, watchfully waiting and too tired to fight. President Willsoon has just finished dictating a note to Switzerland, protesting against the use of Swiss submarines to blow holes in Swiss cheese, addresses the troops:

Call out the standing army and recruit the volunteers;
A foreign foe is in our midst and danger now appears.
Defense must be our watchword; it is time that we prepare
Or he'll carry off our currency and leave our pockets bare.
He has stormed eleven speedways, he has sacked them of their kale;
His Peugeot shows no mercy to the slow, the maimed, the frail.
He has broken racing records, he has broken into print,
If we don't watch out D. Resta sure will break the U. S. mint.

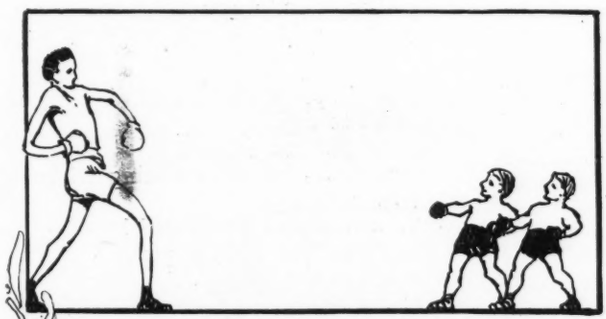


Dry Detroit in a blinding snowstorm. After a futile attempt to crank its cars, mob of motorists surrounds Billy Sunday and sings:

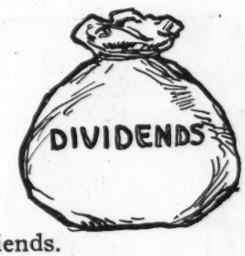
We laughed "Ha! Ha!" at winter till Bill Sunday came to town;
We loved to hear the sleigh bells ring and see the snow come down.
And in the coldest weather, why our engines would not stall,
But now the radiators freeze. We can't use alcohol.
Not only did you cast out rum,
You put our motors on the bum.

Billy Sunday— You are free, you are free
From strong drink and the a. m. agony.
I've knocked out all the saloon bars
And soon you'll run your motor cars
Without any help from John D.
Detroit is dry, Detroit is clean,
There's one more evil, Gasoline,
That Sunday must bring down.

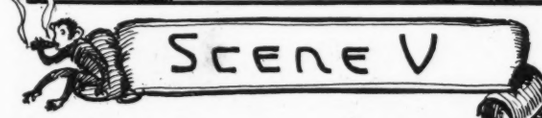
Interior of Madison Square Garden. Tex Rickard, boxing promoter, makes following announcement from center of sixteen-foot ring, in one corner of which sit the Dodge Brothers, and in the other, Henry Ford:



As Willard won't meet Carpentier
I've planned a substitute
Attraction that should raise a cheer,
A bout classed as a beaut.
For here we have the Brothers Dodge
With blows none can resist,
And in this corner, Henry Ford,
"The Battling Pacifist."
They're out for blood; they once were friends.
The purse is scads of dividends.



An old California mission. Wearing a monk's robe, Barney Oldfield is discovered standing on the steps surrounded by a legion of admirers.



Oldfield—
Into the convent now I go.
I'm through.
Admirers—
He's through.
Oldfield—
My pace, once fast, will now be slow.
That's true.
Admirers—
Too true.
Oldfield—
No more with death on track I'll flirt;
I might get killed, I might get hurt;
I want no bed of sexton's dirt,
Do you?
Admirers—
Adieu.

Oldfield—
But wait! In nineteen-seventeen,
I'll have a rebuilt speed machine.
"Retirement" now is my refrain
But I'll come back to race again.
Admirers—
Shades of Patti!
Are we batty?
Can we not trust our pearly ear?
You've been inspired
And have retired
Year after year, year after year.

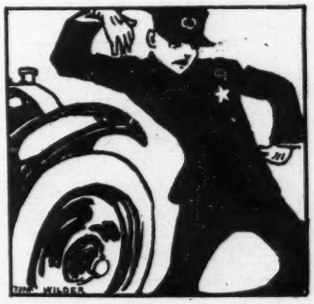
Meeting room of the standard traffic rules committee of the American Automobile Association, the chairman makes his report.

Former road rules were not graphic;
These will regulate the traffic.

If you turn a left hand corner,
Cross your breast just like a mourner.

If to the right you wish to turn,
In your lamps some red fire burn.

Should you plan to make a stop,
Merely kill the traffic cop.



Scene VII

Fashion salon of Lady Duff-Gordon. Motor car engineers, wearing baby blue and shell pink smocks, assembling a new car, stopping occasionally to drape upholstery on living female models of exceeding pulchritude. They sing:

Perfume of sweet heliotrope!
Why in darkness did we grope
Building cars for motor duty
When the public wanted beauty,
Cushions made of crepe de chine,
Bias-cut from soft Nile green?
Grease in axles is passé,
Now we use "Djer Kiss" sachet;
Bore and stroke we never mention,
Chiming clocks get the attention;
Graphophones and running water
Make the hit with wife or daughter.
Delicate the cars and frail,
Style and beauty make the sale.

(Infuriated owner enters and stamps to center of stage)

Owner—The last car that you turned out balked at hills
with shrieks of fear.

Engineers—But the lady testers told us that it was a perfect dear.

Scene VIII

The woods of Belle Isle, Detroit. Howard Coffin and the forty-seven other Hudson engineers dance about the shrine of Mulford and sing:

O! mighty is Ralph Mulford and we sing his
praise to-day.
Before he put the Supersix
Through many record-breaking tricks
The sky was very gray
And people sometimes wondered how
we drew our weekly pay.
So we sing his praise to-day.
Away! Away!
We sing his praise to-day.

Scene IX

Headquarters of the National Motor Car Stealing Trust, Inc. Affluent directors of the corporation stop buying champagne and war stocks to burst into joyous song:

No longer do we blow bank vaults or cook the blasting "soup";
The gold-brick buying farmer is immune, but once our dupe.
We are done with picking pockets, we are done with forging
checks,
Yet we still are very crooked and in crime up to our necks.
There's another graft that's safer and rings in a pile of "jack"—
We merely borrow motor cars and never bring them back.

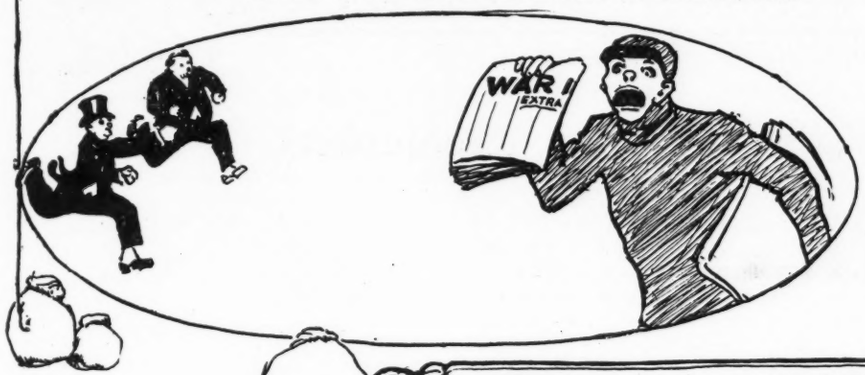
Scene X

The capitol at Washington, D. C. Congressmen and senators holding jollification meeting following passage of the Shackleford bill appropriating $75,000,000 for federal aid in the construction of highways.

Our Uncle Sam is generous, he gives with lavish hand
And now he'll spend his millions for good roads throughout the
land.
He'll build a concrete boulevard from faroff Reubenville
Across the wastes of Nowhere to some secret moonshine still.
And though none will ever use it but the cows and mountain
goats,
The plan is more than wonderful, for we will get the votes.

Scene XI

Broadway and Forty-second street, New York. Crowd of motor car manufacturers storm newsstand and give $100 bills for war extras. They hurriedly scan the black headlines and are moved to lamentation.



"Ten thousand die in German trench."
War is awful!
"France overcome by powder stench."
War is awful!
"England buys more U. S. cars
As parts of the machine of Mars."
"Belgium cut by battle scars."
War is awful!
And Sherman said that war was like
The place of red hot pitch;
We think that war is awful for
It's made us awful rich.

Scene XII

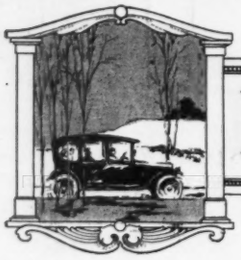
Suffragette mass meeting in honor of Miss Amanda Preuss.

You've freed our sex from much abuse,
You've earned the laurel wreath, Miss Preuss,
For courage and for skill.
'Cross desert sands, through mountain snow,
Where only man once dared to go,
You drove and dealt his pride a blow.
On you our praise we spill.

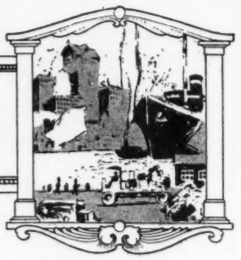
Final Grand Tableaux

Two million, five hundred thousand motor cars roll down illuminated runway, erected in center aisle of theater, onto the stage where a regiment of traffic officers autocratically points to a huge sign—"You Can't Park Here."

Curtain



EDITORIAL PERSPECTIVES



The Motorist's New-Year Resolutions

1—I WILL read the Instruction books that come with my car.
2—I WILL examine my battery every other week and fill it with water if necessary.
3—I WILL test the inflation of my tires twice a week and keep them pumped up.
4—I WILL keep out of car tracks and frozen ruts.
5—I WILL examine the oil level in my crankcase before each trip.
6—I WILL use an anti-freeze in my radiator in cold weather.
7—I WILL have my car washed immediately after each muddy trip.
8—I WILL turn up grease cups and fill oil holes without waiting for squeaks.
9—I WILL not tinker with parts that I know nothing about.
10—My watchwords will be, "Safety First and Courtesy Always."

Included in Your Toast

THE clink of the glasses when the clock struck 12 and the figure six slid out of the calendar to make way for a numeral one unit greater, announced the end of the biggest year in motor car history and the birth of a new one possibly as big. It will be great in motor car production, but still greater in motor car perfection.

THERE is not a factory, outside of a very few who have operated on a constant, conservative policy for a number of years, that will not increase its production. It is naturally affecting part makers, foundries, drop-forge plants. The prosperity of the motor car business is unrivalled by any industry in the country, not excepting steel production so directly affected by enormous war orders.

THIS tremendous speeding up of production is having a marked effect on the makeup of the car. And here figures in one of those providential combinations which favor both builder and consumer. The motor car buyer wants simplicity. He wants an absence of parts where parts are not needed. He wants parts which need attention so located that he can get at them easily.

CONSIDER the manufacturer's side. He is working towards the same end and the balances are even. The more simple the car the more quickly it may be assembled. The more accessible the parts, the less trouble the assembler has in fitting those parts to the chassis under construction.

IN THESE days, when one man works 8 hours a day turning down on nut on the same part of each chassis which comes crawling toward him on an uncanny looking endless chain, it is quite desirable from a manufacturing standpoint that that nut be so located that the laborer can get it firmly seated before his allotted 15 sec. per chassis, or whatever it may be, has terminated.

WHEN the time comes that the owner of the car wants to remove that bolt, it is going to be just as easy for him to reached as it was for the assembler. Thus, we have accessibly located parts. We have instrument boards which carry all wiring and are assembled with the chassis so that the body may be removed from the car without touching a wire. If the instrument board is not of this construction, the wiring is carried to a single fuse board on the dash which may be removed, permitting the removal of the body and dash without tangling up a lot of complicated wiring.

WE ARE finding oil cups placed on top. There is a marked improvement in the layout of twin powerplants. The space between the Vs is being cleaned out and the carbureter adjustment is being put within reach.

WHEN glancing over the chassis in the motor show make it a point to notice the little details of accessibility of parts. Note the location of the oil cups, the situations of various points of adjustment. You will find a number of little things that you have never read about and that the dealer has not told you about. There are little details in the makeup of every car which even the factory publicity departments do not consider worth mentioning, but they are there for a purpose and to favor the owner. Look for them.

HERE are a few of the places in which the designers are giving us a new and wonderful simplicity, intake and exhaust manifolds cast integral with the motor, simple starting motor drive replacing a cumbersome lot of clutches and levers, conduit electrical wiring and grouping of fuses and electrical instruments, a general wave toward Hotchkiss drive which eliminates torsion tubes and radius rods, frame extensions to constitute the running boards, use of frame cross members as locating places for brake-rod equipment and even as rear-seat heel boards.

EVEN the body design is exemplifying the trend toward simplicity. The lines are plain. Everything is smooth. The humped-up and ungainly cowls of a few years ago are gone. Radiators are simple with rounding tops. Some time back designers seemed to consider that radiators must express individuality and the result was an odd-looking assortment of shapes which were far from beautiful. Now there are a dozen radiators that one can hardly tell apart. It is the age of motor car simplicity and the owners may be thankful.

New York Curtain to Rise Saturday

Opening of Motor Show Is Expected to Reveal Greater Versatility Than Ever

NEW YORK, Jan. 2—The stage is set, and next Saturday afternoon at 2 o'clock when the button is pressed that raises the curtain on the seventeenth national motor show in Grand Central Palace, it is a record-breaking program that will meet the eyes of spectators. Not only is the diversity of exhibits greater than ever, but a new year in production such as has never been equaled has put energy into the exhibits, which bid fair to attract a larger attendance than has visited the New York show any one year since motor shows became vogue.

Cars of every description and sort, from the smallest, costing less than $400, to the most expensive limousines, priced in the neighborhood of $10,000, have been rehearsed for the great event, and a chorus of accessories, supplies and parts embodies all that is latest and best in that art of interesting the car devotee. Practically everything from closed car bodies down to new-fangled cotter-pins are in the wings, awaiting the proper cues. In fact, the one and only accessory not displayed is that commodity gasoline, which is barred by the fire department.

400 Cars to Be Exhibited

No less than 400 complete cars will be on the stage at 2 o'clock Saturday, and during the next few days those delayed in transit will be added. Just how many hundred tons of parts and accessories will be seen it is difficult to estimate. As for the body characters who have part: Starting with the regular touring car for five or seven passengers, the roll includes the convertible touring car, roadster, coupelet, coupe, convertible coupe, clover-leaf, sedan, convertible sedan, open sedan, limousine, open limousine, Berline, brougham and landaulet. And if one be unable to distinguish between any and all of these characters the show will give ample opportunity for a liberal education in such knowledge.

Twelves, eights, sixes and fours will be represented in the engines among those present. Each type of motor has undergone more or less improvement during the 1916 rehearsals, and these should make the show that much more interesting.

The annual motor show given by the National Automobile Chamber of Commerce, Inc., has before this drawn attention to its large attendance, and this year promises even greater cause for attention. More than 250,000 persons attended the 1916 show. This year more special trains and excursions will be run to the show from distant cities than ever before in the industry, and there is consequently little reason to doubt that the attendence records of last season will be changed materially.

As is the custom special days have been arranged as the different acts to the show. Saturday, naturally, is Opening Day; Monday, Military Day; Tuesday, Pioneers' Day; Wednesday, Society Day; Thursday, Society of Automobile Engineers Day; Friday, Club and Association Day, and Saturday, Jan. 13, Closing Day.

Several organizations will meet between the acts of the show. The N. A. C. C. will have its annual banquet. The S. A. E. will hold its mid-winter meeting. The Motor & Accessory Manufacturers will hold its annual meeting. Various boards of these and other organizations will meet.

New members of the show are announced, and more interest is expected because the American six, Ben Hur, Bour-Davis, Doble steam, Dey electric, Drexel, Emerson, Harroun, Jordan, Kent, Pilgrim and Premier have been added to the already large cast.

FACTORY SERVICE AT HOME

Chicago, Dec. 30—Car owners using Delco, Remy and Klaxon electrical equipment will get what practically amounts to factory service at home through the establishment of the Motors Service Co., 2641 South Michigan avenue, which is under the contract with the Dayton Engineering Laboratories, Dayton, Ohio, Remy Electric Co., Anderson, Ind., and the Lovell-McConnell Co., Newark, N. J., to render the same grade of service as the car owner would get direct from the factory. W. C. Boulcott, formerly assistant service manager for Delco, is at the head of the newly formed Motors Service Co., and L. C. Borel, former manager of the Remy branch here, is assistant service manager. The Remy branch has been discontinued to make room for the Motors Service Co., which started business Dec. 18.

Price Increases

Detroit, Dec. 29—The Oldsmobile Co. has increased prices $100, to take effect Jan. 1.

MAXWELL PRICE INCREASE $40

Detroit, Mich., Dec. 29—Increase in the price of the Maxwell touring car and roadster to take effect Jan. 1 will be $40 on each instead of $135 for the touring car and $120 for the roadster as announced in the December 21 issue of MOTOR AGE.

REO INCREASES PRICE

Lansing, Mich., Dec. 30—The Reo Motor Car Co. has increased the Reo six-cylinder touring car and roadster models from $1,150 to $1,250. Other models are being continued at former prices but the company states that it will be unable to guarantee these prices throughout 1917.

TIRE COMPANIES RAISE PRICES

New York, Jan. 2—Special telegram—Goodyear and Goodrich have raised tire prices 10 to 20 per cent. At present Fisk, U. S. Tire, Ajax and others are working on price readjustments and will announce changes in the near future. The Goodyear advance is 15 per cent on pneumatic tire casings and 10 per cent on pneumatic tubes and truck tires. The Goodrich price advances range up to 10 per cent.

RESIGNS FROM SCRIPPS-BOOTH

Detroit, Dec. 29—W. I. Brown has resigned as sales manager for the Scripps-Booth Co. to join the staff of the Harroun Motors Corp.

CONSOLIDATED TIRE WINS

Chicago, Dec. 30—Approximately $400,000 in royalties and interest has been awarded to the Consolidated Tire Co., maker of the Kelly-Springfield tire, in its cases against the B. F. Goodrich Co. and the Republic Rubber Co., involving patent license infringement by the defendants. The proceedings involved the old Grant tire and its three patents of tire, channel and wire, and the decision was in confirmation of a report recommending a 5 per cent royalty by the master in chancery. In the case against the B. F. Goodrich Co., the royalties awarded amount to $262,298.95; the Republic Rubber Co., $114,064.65. These amounts, together with the interest, which will be between $15,000 and $20,000, bring the grand total of money involved near the $400,000 mark. A similar case against the Diamond Tire Co. is yet to be decided.

HOTEL BUYS TAXICABS

Chicago, Jan. 1—The La Salle Hotel of Chicago has the distinction of being the first hotel in the United States to operate its own taxicab service. Recently it closed a contract with the Willys-Overland Co., Toledo, Ohio, for fifty Willys-Knight taxicabs and announced that the service would be inaugurated Jan. 1. Meanwhile the freight tie-up became worse, and it seemed improbable the new service could be installed. Dec. 29, however, seven taxicabs were shipped by express, and to-day, Jan. 1, these were put in service. The full quota will be shipped as soon as possible.

Would Have Ton-Mile Cost Compiled

A. A. A. Good Roads Board Chairman Cites Road Type Selection Method

WASHINGTON, D. C., Dec. 30 — The necessity of gauging the amount of traffic a road will undergo before selecting the type of construction is given by George C. Diehl, chairman of the A. A. A. good roads board, as a reason for determining the cost of moving a ton a mile over each of the several types of pavement and with each of the several kinds of traffic. Knowledge of the total cost of construction and maintenance and the amount of traffic tonnage would be required and could be obtained from the records of the highway departments and a traffic census of passenger and commercial vehicles and of motor-driven and horse-drawn vehicles.

"The statistics thus computed could be compared one county with another or among the divisions in a state," says Mr. Diehl, "or among several states if they would adopt uniform methods, which would make it possible to determine the efficiency of the various highway officials from the smallest to the largest subdivision. Improved methods in a single section could be adopted in all, and the mistakes corrected at the least expense and in the shortest possible time. It would be merely necessary for a division engineer to call on the engineer in charge and ask him to explain why the cost was higher than in the adjoining county, and unless a suitable explanation was forthcoming a new man could be employed in his place. But if there was an explanation then the conditions could be controlled by methods similar to those which produced the efficient results in other sections. Likewise, each division engineer could be compelled to maintain a high standard, or lose his position, and each state could profit from the experience and abilities manifested in other commonwealths.

"Until some such system is adopted, selection of the type of road is largely a matter of local sentiment, a guess on the part of the highway officials, or due to activities, credible or otherwise, or agents of road-building materials. While traffic censuses have been conducted in a somewhat limited way, no attempt has been made to do the work systematically and completely."

BUICK ADDS LARGER CHASSIS

Flint, Mich., Jan. 3—In response to the demand for a seven-passenger car of Buick manufacture, a model of that capacity on a larger six cylinder chassis will be added. The first few of these chassis have been finished for exhibition purposes on the show circuit and production will be actively started early in the coming spring.

The new model does not take the place of any of the present cars, but simply completes the line to include this bigger model. Of course, the motor is a valve-in-the-head type along the line of other Buicks. There are, however, a few departures in the valve mechanism and in the drive. The most noticeable feature of the power plant is the fact that the intake valves are larger than the exhaust in order to secure the highest possible volumetric efficiency on this size of motor. The body has the double-cowl feature.

VACUUM OIL GRANTS BONUS

Rochester, N. Y., Dec. 30—The Vacuum Oil Co. of this city has granted additional compensation to many of its employes. All salaried workers receiving not more than $300 a month are benefited. The compensation is on a sliding scale of percentages, from 5 to 25 per cent of the yearly salary received. The action is of further interest in that it coincides with the celebration of the fiftieth anniversary of the company, which was founded by Hiram B. Everest Oct. 4, 1866.

PETROLEUM TAX NEARS $105,000

Milwaukee, Wis., Dec. 30—Nearly $105,000 was contributed to the state of Wisconsin during 1916 by manufacturers, distributors and consumers of gasoline, kerosene, oil and other petroleum products as a special tax, or fee, under the Wisconsin system of oil inspection, which requires that no petroleum product can be offered for sale in this state until it has been regularly inspected and approved as to specified grade by the state oil inspection department. The number of barrels inspected in 1916 is 1,358,530, or about 20 per cent more than in 1915. The inspection fee charged by the state is 7 cents a barrel, producing a gross revenue of $104,105.68. Expenses of administration were $62,927.65, or more than half the receipts. The net profit to the state is $41,178.03. Up to this year, the inspection fee a barrel was 10 cents, but the legislature of 1915 reduced this figure to 7 cents. This caused an actual falling off in receipts, compared with 1915, of $11,127.87, in spite of the large increase in inspections.

The state oil inspection department also keeps records of fires caused by gasoline, kerosene and other petroleum products and reports the total property loss in Wisconsin for 1916 to be $45,261, compared with $90,508 in 1915. This year seventeen deaths resulted from these causes, compared with twenty-one a year ago, and injuries numbered fifty against 103.

COUPE AND SEDAN DETROITER

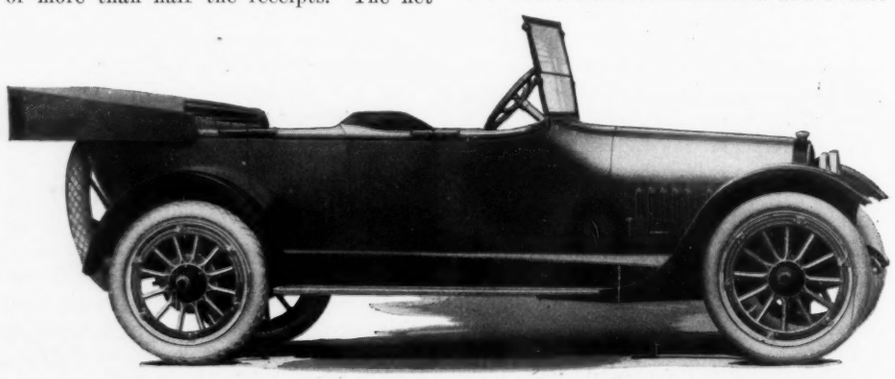
Detroit, Dec. 29—The Detroiter Motor Car Co. has a new convertible coupe and convertible sedan models. The convertible sedan will sell for $1,398; the coupe for $1,373.

WHAT GOODYEAR OUTPUT MEANS

Akron, Ohio, Dec. 30——The tire production of the Goodyear Tire & Rubber Co. for the year just past was 3,500,000. Taking 5000 miles as an average for each tire, the total mileage necessary to wear out the year's output would be 17,500,000. A car would have to cover 4,375,000,000 miles, or twenty-four times the distance from the earth to the sun, and return to wear out all these tires. A car traveling 50 m.p.h. would have to run night and day for 10,000 years to accomplish this.

NATIONAL PARKS ARE DISCUSSED

Washington, D. C., Jan. 2—The National Parks Conference opened today at the new National Museum with Stephen T. Mather, assistant to the Secretary of the Interior, presiding. The conference is to last 5 days, and during that time addresses by different members of the Governmental departments and associations concerned most deeply with the development of the national parks will be given. Aside from the United States representatives, members of the American Civic Association, General Federation of Women's Clubs, New York State Conservation Commission, Smithsonian Institution, the National Gallery of Art and the Universities of Minnesota and Prince-



New Buick car on larger chassis

ton will be on the program of the meeting.

Friday afternoon will be given over to consideration of motor travel to the parks. Dr. H. M. Rowe, president of the American Automobile Association, will preside, and George C. Diehl, chairman of the A. A. A. Good Roads Board, and David G. Joyce, chairman of the A. A. A. touring board, will speak. In addition Orville Wright will talk on "Air Routes to the National Parks"; A. W. Seaman of the Long Island Automobile Club on "Transcontinental Touring Equipment"; and Frank A. Davis, secretary-treasurer of the National Old Trails road, on "Sign Posting the Highways and Byways."

Illustrated lectures will be given each night and the first annual exhibition of national parks paintings will be opened Tuesday evening.

VEHICLE TAXES OPPOSED

Joliet, Ill., Dec. 30—Opposition to an ordinance providing for a tax upon all wheeled vehicles took definite form at a meeting of Joliet motor car owners, when it was voted to circulate petitions of protest. The vote was unanimous for a campaign to eliminate the measure and to take legal proceedings. The council in defending its action asserts that the property owners who paid for the pavements think they have done their share and that the owners of vehicles should pay for maintaining them. License fees provided range from $2 for one-horse vehicles to $20 for the heaviest wagons and motor trucks. The ordinance was passed Dec. 2 and becomes effective Jan. 1.

WEBER RESIGNS FROM MAXWELL

Detroit, Dec. 29—Orlando Weber, vice-president of the Maxwell Motor Car Co., Inc., resigned yesterday.

EMPLOYEES RECEIVE INSURANCE

Detroit, Dec. 29—Employees of the Lewis Spring & Axle Co., Chelsea, Mich., received life insurance policies totaling more than $250,000 from the concern Christmas. The premiums on the policies will be paid by the company as long as the men are in its employ. Those with a service record of more than 6 months received $1,000 policies and under 6 months, $500.

Do Motor Cars Give the Most Service?

These Figures Show They Carry More Passengers Than Railroads or Street Cars Do

NEW YORK, Jan. 1—That motor cars are giving a greater passenger transportation service than the entire steam railroad system or all the urban and interurban electric roads of the United States was the statement made by Alfred Reeves, general manager of the National Automobile Chamber of Commerce, before the Automobile Club of America Dec. 28. He based his statement on figures from the Bureau of Railway Economics.

Reports for 1914 showed that the steam railroads carried 1,053,000,000 passengers an average total distance of 33.61 miles, or a total of more than 35,000,000,000 passenger miles and earned $700,400,000 for this service. The mileage has increased little since then, according to the Bureau of Railway Economics, but the 3,250,000 passenger motor cars now registered in the country average 5,000 miles a year, and at the conservative estimate of three passengers to a car give a service of 48,750,000,000 passenger miles. This would be worth $975,000,000 on the railroad basis of 2 cents a mile, or $200,000,000 more than the railroad passenger service.

The 25,000 commercial motor vehicles average 50 miles a day with an average load of 2 tons, giving a total of 3,750,000,000 ton-miles annually. A fair average cost of hauling by horse-drawn vehicles is placed at 20 cents a ton-mile, and this would make the truck's accomplishment worth $750,000,000.

WILLYS-KNIGHT EIGHT-CYLINDER

Toledo, O., Jan. 3—The initial appearance of the Willys-Knight eight will be made at the New York show. The car is very similar in design to the Willys-Knight four except that the Knight features of this motor are incorporated with conventional features found in twin power plants. The bore of 3⅜ in. is the same as in the four but the 4 in. stroke is 1 in. smaller. At present the car is available with a seven passenger touring body of the double cowl type. The finish is in French blue and the trimmings are black enamel. The price of the car is $1,950 with wire wheels $85 extra.

KLAXON MAKER IS SUED

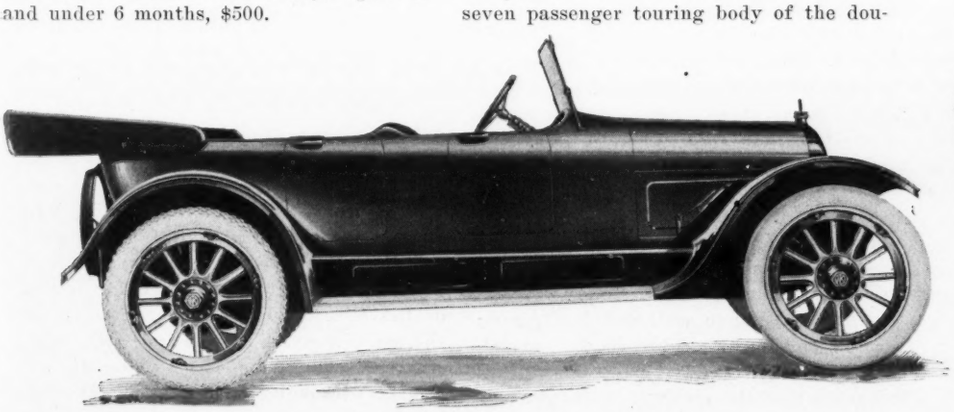
Newark, N. J., Dec. 30—Suit has been brought today against the Lovell-McConnell Mfg. Co., this city, maker of Klaxon horns, by the Department of Justice in the Federal District Court to secure injunctions under the Clayton Anti-Trust Act to prevent inforcement by the defendant of contract stipulations that jobbers handling its horns shall handle no others, and shall sell horns at the prices the Lovell-McConnell Co. fixes.

FIRESTONE STOCK DISTRIBUTED

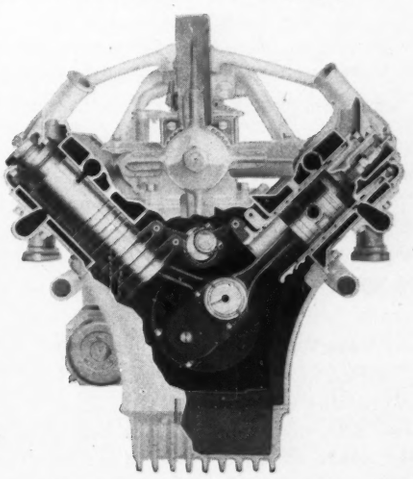
Akron, Ohio, Dec. 30—The Firestone Tire & Rubber Co. has offered from one to ten shares of stock to each employe, according to the term of service, so that every worker may become a stockholder of the concern if so desired. The plan provides for the distribution of shares at $100 each, though the present market value is placed at about $140. Easy payments are to cover a period of 5 years with provision for the beneficiary of the employe to carry out the purchase agreement or sell the stock back to the company.

URGES DIRECT MILL TAX

Milwaukee, Wis., Dec. 30—The total remaining cost of placing all highways and bridges in Wisconsin in reasonably fair condition for maintenance is estimated at $87,000,000 by the Wisconsin State Highway Commission in its annual report for 1916, which urges a direct mill tax for road construction and maintenance and a decided change in the present method of building roads that require vast expenditures for reconstruction and upkeep.



Willys-Knight eight-cylinder car just announced



Cut-away Willys-Knight motor

Sixty Million for Cars

California Spends More Than $1,000,000 a Week for Machines in 1916

Los Angeles Buys About 30 Per Cent of Total

LOS ANGELES, Cal., Dec. 25—True to her best records in the motor car world, California by buying, at a conservative estimate, 33⅓ per cent more cars in 1916 than in 1915, has more than exceeded the $60,000,000 mark. Final registrations for the year are of course not all in, but the figures for the first 50 weeks results in this estimation.

At the close of 1915 Los Angeles county had 48,769 motor cars. Dec. 1, 1916, Los Angeles county had 64,193. Los Angeles had 35,282 of the 48,769 cars at the close of 1915. By the middle of this month Los Angeles had 42,316. Sixty per cent, in fact, of the new machines bought during the last year are accredited to southern California, and nearly half of those are accredited to Los Angeles.

January led in the number of sales. Final figures for December are expected to show this to be the poorest buying month. However, the announced increases in prices Jan. 1, 1917, has stimulated purchases at a time when the sales otherwise would have been much less. Prospective buyers customarily hold off during December, because they do not care to buy licenses that are good for a few days only.

BARTON HEADS NORTHWAY

Detroit, Dec. 30—Henry Barton has been made president of the Northway Motor & Mfg. Co. Mr. Barton has been an executive of the General Motors Co. for several years.

PACKARD'S FREIGHT ARRANGEMENT

Detroit, Dec. 29—The Packard Motor Car Co. has made special arrangements with custom officials of Canada to permit it to make shipments of Packard cars from Windsor, Ont., directly across the Detroit river from Detroit. The company has also rented twenty-six freight cars that are used in summer for carrying race horses. These cars are privately owned and are in consequence to be used only for Packard shipments and are returned to the factory as soon as they are unloaded.

SHOW TO BENEFIT ROADS

Milwaukee, Wis., Dec. 30—The opening day of the ninth annual Milwaukee show, Jan. 5-11, inclusive, has been dedicated to the cause of good roads, and the gross receipts Friday, Jan. 5, will be donated by the Milwaukee Automobile Dealers, Inc., which conducts the exposition. A similar plan was followed at the second annual state fair show last September, when one day's receipts were turned over to the road association. The M. A. D. has designated each day of the show as follows: Friday, Good Roads; Saturday, Milwaukee Automobile Club; Sunday, Interurban; Monday, Merchants and Manufacturers; Tuesday, State Dealers; Wednesday, Milwaukee; Thursday, Grant Six day. On the closing day a Grant Six will be awarded.

TO PURCHASE BADGER BRASS

Detroit, Dec. 29—The C. M. Hall Lamp Co. has an option on the Badger Brass Co., of Kenosha, Wis., and will complete the purchase details shortly.

MANY CHANGES AT STUDEBAKER

Detroit, Dec. 29—Henry Kennedy of the foreign department of the Studebaker Corp., has been made branch manager at Omaha. L. A. Keller, formerly the Omaha branch manager, has been transferred to the branch at Portland, Ore., which was formerly managed by A. H. Brown, who has become a Studebaker dealer at Albany, N. Y. A. W. Crossman, who was formerly the retail manager in Detroit, has become the manager of the Los Angeles branch, position was vacated by the resignation of R. D. Maxwell, who has joined the organization of the Ables Co., Studebaker dealers at Honolulu.

BRANDENBURG SUES BUDA

Chicago, Jan. 2—Suit was filed here today in the circuit court of Cook county by Brandenburg & Co., Chicago, New York and Detroit, against the Buda Co., Harvey, Ill., alleging breach of contract and asking for damages of $250,000 and an accounting according to terms of sales contract. Brandenburg & Co. state that in the summer of 1911 a contract was entered into with the Buda Co. by which Brandenburg became the sale organization for the Buda company for a term of years which Brandenburg & Co. state might be terminated by mutual consent July 1, 1917.

The Buda Co. holds that according to the contract the latter could be terminated July 1, 1916, and undertook through a written notice so to terminate the contract July 1, 1916. Brandenburg & Co. state that they have tried to carry out their agreements with the Buda Co., but that the Buda Co. since about July 15, 1916, has persistently refused to recognize Brandenburg & Co. as its sales representative. Brandenburg no longer represented Buda. Brandenburg & Co. further allege that they have sustained damages on account of the alleged breach of contract, and they allege that the Buda Co. notified customers that Brandenburg no longer represented Buda.

Bankers Believe in Cars

But the Money Merchants Also Think Thrift Should Be Made Guide

Wisconsin Motorists Are Advised to Heed Economies

MILWAUKEE, Wis., Dec. 30—A decided change of heart in the attitude of Wisconsin bankers toward the motor car industry in one year's time is indicated by the trend of thrift propaganda undertaken by the Wisconsin Bankers' Association. Whereas as late as a year ago country bankers viewed with considerable concern the enormous increase in the number of cars in Wisconsin, they are at this time not only accepting the new order of things, but actually argue in favor of it.

The publicity department of the Wisconsin Bankers' Association in its most recent bulletin, published generally in the daily and weekly papers of the state, speaks as follows:

"Have a car if you can afford it, and not because your neighbor has one; get all the pleasure out of it possible, but remember 'Thrift'—those little economies in oil, tires, gas, electricity and the like. There will come a time, if it is not already here, when every man who earns $1,200 a year in small places and $1,800 a year in the larger towns can afford and should have a car. It brings more lasting and beneficial pleasures than any other medium yet devised as a pastime. It takes you out of doors. It gives you a chance to picnic with the family, see the country, save time, entertain as no other device ever can, and has its proper place in the scheme of life. But a little study of cars and their care and operation, thought for the little savings that are possible, will make what would seem to be a burdensome tax a real and lasting benefit.

"If, out of the millions of car owners of this country, only a small percentage were to practice thrift in the use of gasoline, the consumption would be greatly reduced and the cost cheapened accordingly; for the high prices must of necessity be traceable to the huge and insatiable demand that results from hundreds of thousands of cars used daily."

WANT CONVICTS FOR ROADS

Kansas City, Mo., Dec. 29—The Kansas City Motor Car Dealers' Association, through its legislative committee, has completed arrangements for co-operating with the St. Louis Dealers' and Manufacturers' Association in an effort to secure the enactment of a law at the approaching session of the Missouri Legislature providing for the use of convict labor on the state highways. Local motor car dealers, as well as others throughout the state, believe that to the Wisconsin Good Roads Association

the money paid by car owners for their state license should be expended in a manner that will be of direct benefit to them. Hard surfaced highways are regarded by dealers and car owners as being a matter of foremost importance and so they propose that the money paid in car taxes be expended in a manner that will give the whole state of Missouri a well planned system of roads of this type. Under the present method the funds available are expended on dirt roads, many of them located in remote and little traveled parts of the state with the result that Missouri is regarded as one of the most backward states in the union in the matter of permanently improved highways.

ST. LOUISANS GET TAGS

St. Louis, Mo., Jan. 1—There was the usual scramble last Tuesday for favorite numbers when the 1917 city motor car tags were put on sale. Nos. 1 and 23 were the most popular, but No. 13 was neglected. For years it was a favorite. The tags are round, 2⅞ in. in diameter and have white characters on a blue ground. The cost ranges from $2 to $12 according to the power of the machine. These tags are apart from the state tags.

SENECA FOUR ANNOUNCED

Fostoria, O., Dec. 29—The Seneca Motor Car Co. will start production soon on a four-cylinder, five-passenger car selling for $735. It will have an L-head Le Roi motor giving 27 h.p. at 2200 r.p.m., disk clutch and three-speed gearset in unit. Cooling is by thermo-syphon, the carbureter is a Zenith and the electric equipment consists of a Remy distributer, Willard storage battery and Allis-Chalmers starting and lighting system. Tires are 30 by 3½ with demountable rims and non-skid tires in the rear are standard. The wheelbase is 118 in. A three-passenger roadster will also be manufactured.

STATE FLOWER NAMES CAR

Los Angeles, Cal., Dec. 25—The car which is to be built by the newly organized Eisenhuth Motor Co. has been named the Poppy car in honor of the state flower of California. The company has been organized with a capital of $10,000,000 and will erect a plant at Los Angeles Harbor. Construction will begin during January.

The Poppy car will be a five-cylinder machine of new design, distinctive and unique, according to its sponsors. The motor is to be self-starting. No transmission will be used, and a secret and exclusive system of reverse is to be featured. By use of a new gear invention the drive will be direct. It is claimed that various manipulations will eliminate 1202 parts of the present standard car. The engine is to have seventy-nine parts against the customary more than 200 in a four-cylinder type. The car is to sell for $650 at the factory. It will have a wheelbase of 120 in. and accommodate four passengers.

Car Tax for U. S. Funds?

Congress May Make Levy On Vehicles to Meet Deficit in Federal Revenue

Will Be On Basis of Wholesale Price of Various Makes of Machines

DETROIT, Dec. 29—Reports from Washington state that Congress will again consider motor car tax as a method of increasing the government revenue. The plans to be suggested will include a tax of $12 for motor cars wholesaling for less than $500, $18 for cars wholesaling at less than $1,000 but more than $500, $20 for cars wholesaling between $1,000 and $2,500, and $25 for all cars bringing more than $2,500.

BAN ON IMPORTS TO INDIA

New York, Dec. 29—The importation of motor cars into India has been prohibited by government order, according to cable dispatches received by Dodge & Seymour, Ltd., export merchants of this city, handling the Ford and Hudson in British India and the Orient. According to the ruling no shipment will be permitted to enter India which has left the United States after Jan. 1, 1917.

MOUND CITY SAFETY BUREAU

St. Louis, Mo., Jan. 1—A bureau of public safety will be opened in the police headquarters or city hall this week under the general supervision of Director of Streets Talbot. The plan will be to educate people in safety-first measures. Complaints against reckless driving will be investigated and the offenders summoned to the bureau before court prosecution is tried. The motor car situation will be made a special study. The last police figures given out are that 65 persons had been killed by motor cars in the city from Jan. 1 to Nov. 1, 1916.

SEISS CO. BUYS PLANT

Toledo, Ohio, Dec. 29—The Seiss Mfg. Co., this city, has bought a factory with 52,000 sq. ft. of floor space. The purchase makes possible a triple expansion. Operation in the new plant will start about Feb. 1.

$34,500,000 FOR ARMY TRUCKS

Washington, D. C., Dec. 30—Reports from the War Department show that about $34,500,000 has been spent in the purchase and operation of army motor trucks this year. The last army bill appropriated $23,000,000 for the present fiscal year, and an estimate of a deficiency appropriation of $11,415,770 has been submitted.

Many of these trucks were in use on the Mexican border. Some of them now are stored at Fort Sam Houston, Fort Bliss and El Paso, Texas, where they are available for future use. About 2300 trucks were bought for use on the border and in Mexico.

MONITOR COMPANY EXPANDS

Columbus, Ohio, Dec. 29—Arrangements have been made by the Monitor Motor Car Co. of this city to produce 3000 cars during the coming year, and its plant is being enlarged and equipped with that end in view. The company started 4 years ago as the Cummins-Monitor Motor Co., and each year has increased the number of cars turned out.

ONE WAY TO DO IT

Indianapolis, Ind., Dec. 30—The Premier Motor Corp. can claim credit for obtaining the long-wished street cars to carry their employes to and from the factory. Just before Christmas the company got tired of asking for these street cars and not getting them, so it ran a full-page newspaper advertisement to tell the public about it. Twelve hours of advertising did the work. They got the street cars.

MOORE GOES TO EUROPE

New York, Jan. 2—Bob Moore, racing driver, sailed for Europe Dec. 23. He represents a man in Texas, his home state, who is sending him to Europe to look over the racing car situation and to pick up two or more cars of first-class quality if they can be obtained.

HUPP TRAVELING NORTH

Detroit, Dec. 29—The Hupmobile capital-to-capital car, having completed the four capital corners of the United States, is now traveling north through the Southern Coast states to Washington. At present the car is between Atlanta and Nashville.

BUICK PROTESTS CAR ORDER

Flint, Mich., Dec. 29—William H. McLeod appeared before the interstate commerce commission at Washington, D. C., and protested against the issue of an order requiring the Buick Motor Co. to return to the owning roads within thirty days, all cars in the possession of other roads. He stated that such an order would produce a confusion that would force many of the factories to close because of the sudden withdrawal of cars on which the movement of the output is dependent.

BLAMES DEALER ALLOTMENTS

Detroit, Dec. 29—R. C. Rueschaw, sales manager for the Reo Motor Car Co., has issued a statement in which he attributes the freight car congestion, in great part, to the shipment of cars on dealers' allotment schedules. He states that frequently dealers are unable to make the payments for these cars which are consequently held in the freight cars, thus keeping them from being emptied.

Astor Salon Shows Fifteen Makes

Thirteenth Annual Exhibition Opens with Eleven Made-in-America Brands on Display

NEW YORK, Jan. 2—Special telegram—The use of semi-dull finished bodies, upholstery devoid of the usual tufting and minute attention to detail constitute the principal features of the thirteenth annual salon which opened today at the Hotel Astor. The number of American cars is greater this year than ever before, and the work of American body-builders is far more representative. Fifteen different makes of cars are displayed, and eleven of them are American.

The show is essentially an exhibition of the latest in body designs. It is also a forecast of body fashions. In addition, several cars new to the American market are revealed to the public for the first time. These are the Biddle, Daniels, Murray, Phianna and Novara.

The Novara is the newest of these and is built in the plant of the Herreshoff Mfg. Co., Bristol, R. I., for G. M. Thurber of the Isotta Fraschini Motors Co., New York, and Sidney De Wolfe Herreshoff, who will market it. The car is small and is a speed creation supplied only with a mahogany roadster body, the price being $2,750. It is equipped with a block, 3 by 4¼ overhead valve, high speed four-cylinder motor with drilled Lynite pistons and drilled connecting rods. Speed capabilities are over 50 m.p.h. on second speed and over 70 m.p.h. on high. The weight is 1500 lb.; the wheelbase 110 in.; and the tires 31 by 4. The body is built of mahogany laid in the same manner as a yacht hull, with a one-piece unbound windshield. Rolled fenders hug the wheels tightly, and absence of the usual skirt to the body gives a distinctive touch. The car will be built only to order.

Semi-Dull Finish Is Preferred

A semi-dull finish is preferred by many of the exhibitors. It is said that those who will purchase these high-class, high-priced cars have taken a pronounced likening to the unobtrusiveness of this finish. Tufting has disappeared from the upholstery in a great many cases, this being particularly noticeable in the outside seats of the inclosed cars for the most part. Somber colors are chosen for the inside upholstery, and several jobs are done in tapestry.

One of the features of these custom bodies is the great attention given detail. Neatness appears to be the paramount thought in the minds of the designers. The binding on windshields is getting smaller; body molding is getting smaller, and in some cases is disappearing. It is these little things which have such a big effect in giving the custom body its air of exclusiveness. Darker colors are coming more into use.

Among the extreme body styles there is a Lancia hydroplane, a sporty type of roadster devoid of top or windshield and finished entirely in dark maroon. The cowl is the highest part of the body, the lines sloping back to a rear deck.

Both Locomobile and White have comprehensiye exhibits, including nearly every type of body. In the Locomobiles, an innovation is equipment with dictaphones. One body is a sporting cabriolet in which the closed portion of the body entirely disappears. The usual side lamps are set into the windshield, leaving the exterior of the body entirely unobstructed. Another is a special boat type in which the top body line breaks sharply at the cowl and is continued straight back to a commodious rear deck. Seats are adjustable. A feature of the Locomobiles is the use of accelerator pedals the full length of the foot and shaped like the sole of a shoe. One Locomobile has the top body line beveled instead of fitted with the usual molding.

The pointed-front closed car is a popular style, White and Locomobile and others showing these. In them the body lines are perpendicular at the side. White has two pointed-front coupes, both finished semi-dull. These, with the other Whites, are equipped with the new sixteen-valve four-cylinder motor. Another White model is a boat type cloverleaf roadster with a slanting, pointed windshield and a beveled top body line. One noticeable feature of all these custom bodies is the trim manner in which fenders hug the wheels.

Daniels has an unusual type of White touring car fitted with a black Victoria top and equipped with a windshield at the back of the front seats, which slides up or down in the same manner as the windows in a limousine. A small crank operates it, and the supports fold to close the slot when the shield is down. This body has full mahogany molding.

CORBITT COMPANY RECAPITALIZES

Henderson, N. C., Dec. 29—Through the organization of the Corbitt Motor Truck Co. with a $1,000,000 capital the Corbitt Automobile Co., which started to make motor cars seven years ago but after three years changed to motor trucks, announces the expansion of its territory and an increased schedule of 1200 or 1500 trucks a year. The company makes a line of trucks ranging from three-quarters to five tons in capacity, all worm-driven. One reason for the reorganization is that, since the company has discontinued the manufacture of motor cars altogether, it was thought best to change the name.

RACINE RUBBER PURCHASE RATIFIED

New York, Dec. 29—The stockholders of the Ajax Rubber Co. have ratified the purchase of the Racine Rubber Co., Racine, Wis., and authorized an increase of $10,000 in capital. The formal closing of the purchase will be consummated as soon as the reports of the accountants and appraisers are completed and the figures have been verified.

NEW MERGER MADE

Buchanan, Mich., Dec. 29—The Celfor Tool Co. and the Buchanan Electric Steel Co., this city, have merged as the Clark Mfg. Co., which was organized for this purpose. The manufacturing and selling methods of the two companies will be unchanged, and the personnal of the organization will be the same. The new company is capitalized at $2,000,000 preferred and $3,000,000 common.

S. A. E. PROGRAM FULL

New York, Dec. 30—Members of the Society of Automobile Engineers will have a busy time of it next week, since their annual meeting is scheduled to take place during show week. Jan. 9 and 10 various divisions will meet, and Jan. 11 papers will be delivered at a professional session.

Among the speakers are Capt. V. E. Clark, who will use army experience in operating aeroplanes on the Mexican border as a basis for suggesting changes in design necessary for obtaining a successful military aeroplane; H. L. Horning, who will consider the tractor engine; F. Hymans, who will read a paper on dynamic balance and the types of machines that do such work. N. V. Akimoff will offer a paper on "Dynamics of the Automobile;" A. F. Milbrath, "Some Essential Features of High-Speed Engines;" W. T. Sinleigh and W. E. Lay, "Heat Balance Tests of Automobile Engines," and E. A. Sperry, "Aerial Navigation Over Water."

John Barrett, director-general of the Pan-American Union, will speak at the banquet to be held at the Biltmore Jan. 11 on "Pan-American Commerce; Our Opportunity." More than 700 reservations have been made for the banquet already. The meeting will end with entertainment at Ziegfeld's Midnight Frolic.

Buyers' Guide to Car Body Types

ON this and the following page is given a Buyers' Guide to various body types of American motor cars which are not illustrated in the succeeding pages. In the section following these two pages are illustrated representative types of 1917 cars classified as to body style and below the illustrations are given in alphabetical form, the names and models, prices and some major dimensions of the cars illustrated on each page.

The table on this page and the opposite one presents the same information on additional body types to those which are illustrated. These two pages, together with information at the bottom of the illustrated pages, form a complete Buyers' Guide in which every body style produced by every American manufacturer for 1917 is listed. For quicker reference to the illustrated section, an index to this section is given herewith:

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Not Illustrated in "Made in America Cars"

FOUR-PASSENGER TOURING CARS

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Cadillac 55, Phaeton	$2080	8	31.25	125	36x4½
Charter Oak, A	...	6	38.40	135	35x5
McFarlan Six, 124	3850	6	48.60	136	35x5
Ogren Six	2500	6	33.75	132	34x4½
Pierce-Arrow, 48	4900	6	48.60	142	37x5
Pierce-Arrow, 38	4600	6	38.40	134	36x4½
Pierce-Arrow, 66	5900	6	60.00	147½	38x5½
Singer, 17	3500	6	38.40	136	35x5

FIVE-PASSENGER TOURING CARS

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Aland, 14-60	$1500	4	14.40	122	33x4
Ams Sterling, 1917	...	4	15.63	110	30x3½
Anderson, 6-40, 200-C	1250	6	25.35	120	33x4
Auburn, 6-39	1085	6	23.44	120	34x4
Bell, 17	875	4	19.60	112	31x4
Biddle, D	2350	4	22.50	122	32x4
Cameron, 1917	1250	6	21.60	122	32x4
Davis Six, Roadster	1195	6	25.35	118	34x4
Davis Six, Roadster	1495	6	29.40	124	34x4½
Emerson Four	395	4	22.50	110	30x3½
Franklin, Series 9	1850	6	25.35	115	32x4
Howard, 1917	1250	6	25.35	118	32x4
Madison, 5, Standard Touring	1050	6	23.44	115	34x4
Madison, 5, DeLuxe Touring	1150	6	23.44	115	34x4
Madison, 7, Standard Touring	1150	6	23.44	124	34x4
Madison, 7, DeLuxe Touring	1250	6	23.44	124	34x4
Majestic, A	3000	8	33.80	135	35x5
Majestic, M	1500	8	28.80	125	32x4
Marmon, 34	3050	6	33.75	136	34x4½
Moline-Knight, MK40, Mod. C	1450	4	22.50	118	34x4
Reo, R	875	4	27.23	115	34x4
Richmond, 4-35	750	4	25.60	110	33x4
Stearns, S K L 4—Series 32	1450	4	22.50	119	34x4

SIX-PASSENGER TOURING CARS

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Anderson, 200-A	$1250	6	25.35	120	33x4
Austin Highway King	3750	12	39.68	142½	34x4½
Charter Oak, A	...	6	38.40	135	35x5
Locomobile 38, R-7	4600	6	43.35	139	37x5
Locomobile 48, M-7	5400	6	48.60	142	37x5

SEVEN-PASSENGER TOURING CARS

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Austin Highway King	$3750	12	39.68	142½	34x4½
Drexel	1485	4	19.60	118	34x4
Fiat, 55-E-17	5500	4	42.03	140	35x5
Hupmobile, N U	1340	4	22.50	134	35x4½

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Laurel, 35	885	4	22.50	112	....
Lexington, 6-P	2875	6	40.84	144	36x4½
Majestic, A	3000	8	33.80	135	35x5
Majestic, M	1500	8	28.80	125	32x4
Paterson, 6-45	1095	6	25.35	117	32x4
Phianna, M (Chassis only)	3600	4	24.70	...	32x4½
Richmond, 6-17, Special	....	6	29.40	124	35x4½
Sun Light Six, 17	1145	6	23.44	116	34x4
Willys-Six, 88-6	1325	6	29.40	125	35x4½
Willys-Knight, 88-4	1285	4	27.23	121	34x4½

TWO-PASSENGER ROADSTERS

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Abbott, 6-44	$1195	6	25.35	122	32x4
Aland, 14-60	1500	4	14.40	122	33x4
Ams-Sterling	...	4	15.63	110	30x3½
Auburn, 6-39	1085	6	23.44	120	34x4
Biddle, D	2200	4	22.50	122	32x4
Briscoe, B	685	4	15.20	105	30x3½
Brunswick	...	4	36.10	120	32x4½
Cadillac, 55	2080	8	31.25	125	36x4½
Cameron	1250	6	21.60	122	32x4
Chevrolet, 490	490	4	21.76	102	30x3½
Chevrolet, F2	800	4	21.76	112	32x3½
Chicago, 6-40, Patriot	985	6	23.44	120	32x4
Chicago, 6-40, White Cap	985	6	23.44	120	32x4
Cunningham, V	3750	8	45.00	130	35x5
Drexel, R-30-35	855	4	19.60	112	33x4
Elcar	845	4	19.60	115	32x3½
Empire, 45, Speedster	...	4	24.03	116	33x4
F R P 45 (Chassis only)	7000	4	33.86	140	36x5
Franklin, Series 9	1800	6	25.35	115	32x4
Geneva, Speedster	2500	6	38.40	139	34x4½
Hal Twelve, 21 A	2385	12	39.68	135	34x4½
Harvard, 4-2T	750	4	14.40	100	28x3
Inter-State, T	850	4	19.60	110	33x4
Jackson, Wolverine	1295	8	28.80	118	34x4
Jeffery Six	1445	6	29.40	125	34x4
Jordan Sixty	1650	6	29.40	127	35x4½
KlineKar, 6-38	1175	6	25.35	120	34x4
McFarlan Six Touring	3700	6	48.60	136	35x5
Mitchell, D-40	1150	6	25.35	120	32x4
Monitor, R	795	4	22.50	108	32x3½
Monitor, O	995	6	25.35	115	33x4
Monroe, M-3, Cloverleaf	635	4	14.40	96	30x3
Oldsmobile, 45	1295	8	26.45	120	33x4
Pierce-Arrow, 48	4900	6	48.60	142	37x5
Pierce-Arrow, 38	4600	6	38.40	134	36x4½
Princess, 4-36, F, Speedster	775	4	22.50	108	32x3½
Singer, 17	3500	6	38.40	136	35x5
Templar	1225	4	38.40	120	32x4

THREE-PASSENGER ROADSTERS

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Charter Oak, A	$ ...	6	38.40	135	35x5
Drummond, B 17	1600	8	28.80	120	34x4
Grant Six, K	825	6	21.60	112	32x3½
Hackett Four	888	4	22.50	112	31x4
Harroun, A-1	595	4	16.90	107	30x3½
KlineKar, 6-38	1175	6	25.35	120	34x4
Marmon, 34	3100	6	33.75	136	34x4½
Moon, 6-43	1295	6	25.35	118	33x4
Pathfinder	2900	12	39.68	130	35x5
Pierce-Arrow, 48	4900	6	48.60	142	37x5
Pierce-Arrow, 38	4600	6	38.40	134	36x4½
Princess, 4-36	775	4	22.50	108	32x3½
Reo, R	875	4	27.23	115	34x4
Ross Eight, C	1550	8	33.80	130	35x4½
Stearns, 4	1450	4	22.50	119	34x4
Stephens, 60-65	1150	6	25.35	115	32x4
Winton, 33	2685	6	33.75	128	36x4½

FOUR-PASSENGER ROADSTERS

Aland, 14-60	$1500	4	14.40	122	33x4
Allen, 37, Cloverleaf	850	4	22.50	112	32x3½
Case, T-17	1190	4	21.03	120	34x4
Drexel, Club	1485	4	19.60	118	34x4
Drummond, B 17	1600	8	28.80	120	34x4
Empire, 60 R	1145	6	25.35	120	34x4
Hal Twelve, Shamrock	2385	12	39.68	135	34x4½
Homer-Laughlin, 8	1250	8	16.26	112	30x3½
Howard	1250	6	25.35	118	32x4
Jones, 6	1475	6	29.40	125	35x4½
Jordan Sixty, Sporting	1750	6	29.40	127	35x4½
KisselKar, 100 Point	1195	6	25.35	117	32x4
Lexington, 6-O, Clubster	1185	6	25.35	116	32x4
Lexington, 6-P, Clubster	2675	6	40.84	132	36x4½
Madison, 4	...	6	23.44	120	34x4
Majestic, A	3000	8	33.80	135	35x5
Majestic, M	1500	8	28.80	125	32x4
Moline-Knight, 50	1750	4	25.60	122	35x4½
Moline-Knight, 40	1450	4	22.50	118	34x4
Packard, 2-25, Runabout	3,050	12	43.20	126	35x5
Peerless, 56	1890	8	33.80	125	35x4½
Reo, N	1250	6	30.46	126	34x4½
Richmond, 6-17, Special	...	6	29.40	124	35x4½
Stearns, 4, Cloverleaf	1450	4	22.50	119	34x4
Stearns, 8, Cloverleaf	2150	8	33.80	123	35x4½
Templar	1250	..	.....	120	32x4
White, 16 Valve 4	4600	4	28.90	124½	37x5
Winton, 48	3500	6	48.60	138	37x5

OPEN SEDANS

Glide, Light Six 40	$1325	6	23.44	119	34x4
Inter-State, T	1250	4	19.60	110	33x4
Jones 6, Touring Sedan	2350	6	29.40	125	35x4½
Premier, 6B, Touring Sedan	2900	6	27.34	125½	35x4½
Standard Eight	...	8	33.80	127	35x4½

CONVERTIBLE SEDANS

Cadillac, 55, Victoria Convertible	2550	8	31.25	125	36x4½
Stearns 4	2050	4	22.50	119	34x4

CONVERTIBLE COUPES

Chandler, 17	$1995	6	27.34	123	34x4
Cole 8, Touring Coupe	2295	8	39.20	127	35x4½

COUPES AND COUPELETS

Abbott, 6-44, Motor Coach	$1495	6	25.35	122	32x4
Allen, 37	1175	4	22.50	112	32x3½
Austin Highway King	4550	12	39.68	142½	34x4½
Brewster, Inclosed Drive	7500	4	25.60	125	34x4½
Cadillac 55	2800	8	31.25	125	36x4½
Chalmers, 6-30, Cabriolet	1440	6	25.35	115	32x4
Dispatch, G	1400	4	22.50	120	36x3½
Franklin, 9, Cabriolet	2650	6	25.35	115	32x4
Franklin, 9, Brougham	2700	6	25.35	115	32x4
Grant Six, K, Cabriolet	1050	6	21.60	112	32x3½
Howard	1650	6	25.35	118	32x4
Lexington, 6-0-17	1350	6	25.35	116	32x4
McFarlan Six, Coupe, 133	4700	6	48.60	136	35x5
McFarlan Six, Cabriolet, 134	5400	6	48.60	136	35x5
Mitchell, C-42	1950	6	29.40	127	34x4
Mitchell, C-42, Cabriolet	1875	6	29.40	127	34x4
Moon, 6-43, Cabriolet	1850	6	25.35	118	33x4
Moon, 6-66	2150	6	29.40	125	35x4½
Moon, 6-66, Cabriolet	2150	6	29.40	125	35x4½
Oldsmobile, 45, Cabriolet	1775	8	26.45	120	33x4
Owen Magnetic, M-25	3500	6	29.40	125	34x4½
Packard, 2-25	4150	12	43.20	126	35x5
Peerless, 56	2700	8	33.80	125	35x4½
Pierce-Arrow, 48	6060	6	48.60	142	37x5
Pierce-Arrow, 48	6060	6	48.60	142	37x5
Pierce-Arrow, 38	5630	6	38.40	134	36x4½
Pierce-Arrow, 38	5630	6	38.40	134	36x4½
Stearns, S K L 4	2050	4	22.50	119	34x4
Stearns, S K 8	2900	8	33.80	123	35x4½
Velie Biltwell Six, 28	1750	6	25.35	115	32x4
Velie Biltwell, Cabriolet	1485	6	25.35	115	32x4
Westcott, S-17, Cabriolet	1890	6	29.40	125	35x4½
White, 16 Valve 4	5650	4	28.90	124½	37x5
Winton, 33, Coupelet	3000	6	33.75	128	36x4½
Winton, 33	3600	6	33.75	128	36x4½
Winton, 48, Coupelet	3750	6	48.60	138	37x5
Winton, 48	4500	6	48.60	138	37x5

SEDANS

NAME AND MODEL	PRICE	CYL.	H. P.	W. P.	TIRES
Abbott, 6-44	$1870	6	25.35	122	32x4
Abbott, 6-44	1820	6	25.35	122	32x4
Aland, 14-60	2000	4	14.40	122	33x4
Allen, 37	1195	4	22.50	112	32x3½
Austin Highway King	4950	12	39.68	142½	34x4½
Chalmers, 6-30	1850	6	25.35	122	34x4
Dodge	1185	4	24.03	114	32x3½
Dort, 9	1065	4	16.90	105	31x4
Empire, 70	1625	6	25.35	120	34x4
Harroun, A-1	850	4	16.90	107	30x3½
Haynes Twelve, 40	2750	12	36.30	121	34x4½
Haynes Twelve, 41	2850	12	36.30	127	34x4½
Haynes Six, 37	2350	6	29.40	127	35x4½
Haynes Six, 36	2250	6	29.40	121	34x4
Howard	1650	6	25.35	118	32x4
Jeffery Four	1260	4	22.50	116	34x4
Jeffery Six	1630	6	29.40	125	34x4
King 8, E	2150	8	28.80	120	34x4
KisselKar, 6-42	2000	6	31.54	128	34x4
Lexington, 6-0-17	1350	6	25.35	116	32x4
Liberty Six	1295	6	23.44	115	32x4
Marmon, 34	4100	6	33.75	136	35x5
Maxwell, 25	985	4	21.03	103	30x3½
McFarlan Six, 136	4700	6	48.60	136	35x5
Mitchell, C-42	2085	6	29.40	127	34x4
Monroe, M-3	965	4	14.40	96	30x3
Moline-Knight, 50	2350	4	25.60	122	35x4½
Moon, 6-66	2250	6	29.40	125	35x4½
Oakland, 34	1020	6	18.99	112	32x4
Oldsmobile, 45	1850	8	26.45	120	33x4
Overland, 85-Six	1325	6	25.35	116	33x4½
Overland, 85-Four	1195	4	27.23	112	33x4½
Peerless, 56	2750	8	33.80	125	35x4½
Pierce-Arrow, 38 C 4	5870	6	38.40	134	36x4½
Studebaker, 6-50	1700	6	36.04	122	34x4
Sun, Light Six	1295	6	23.44	116	34x4
Templar	1850	4	....	...	....
White, 16 Valve 4	5650	4	28.90	124½	37x5
Willys-Knight, 88-4	1950	4	27.23	121	34x4½

LIMOUSINES

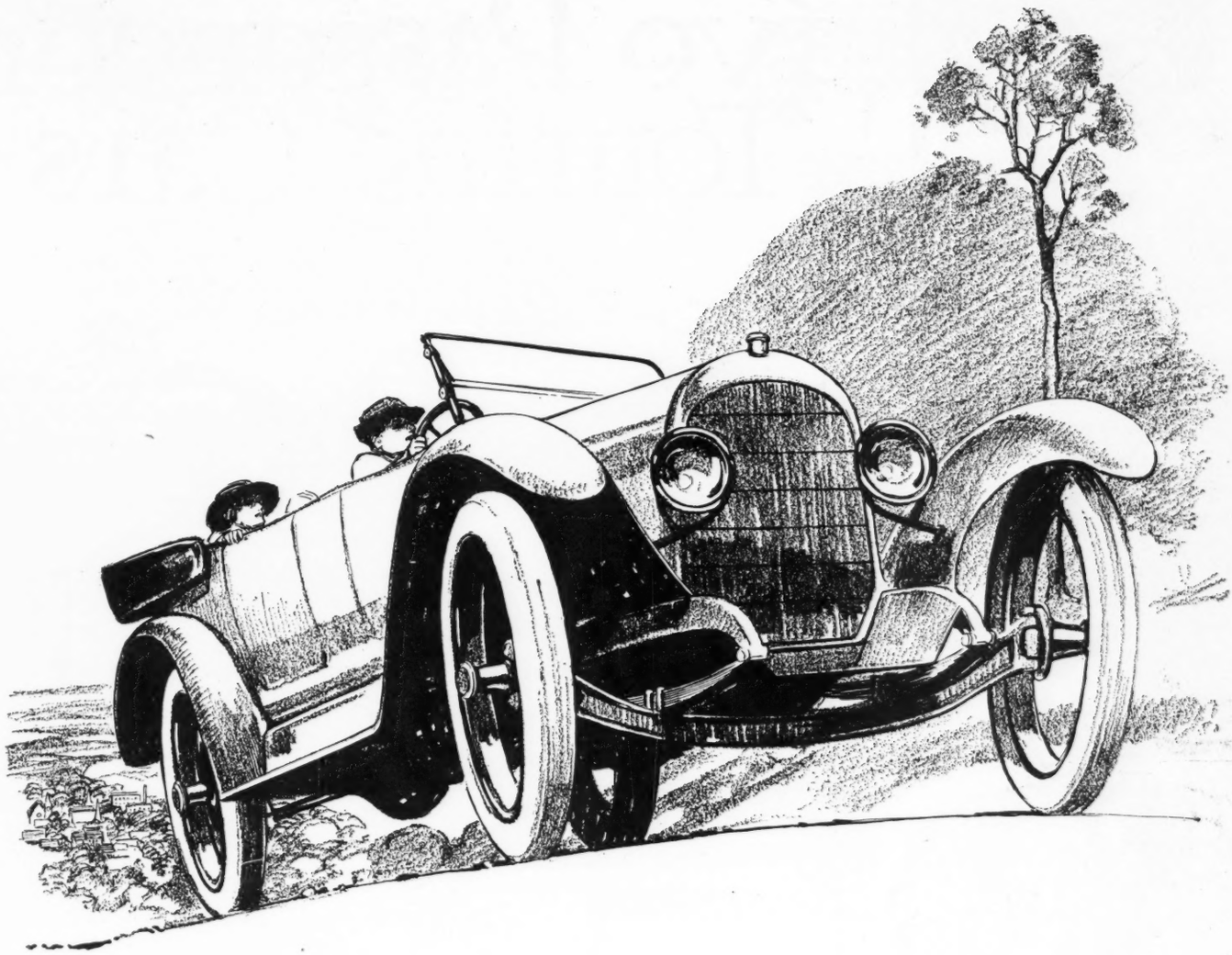
Aland, 14-60	$2500	4	14.40	122	33x4
Austin Highway King	5250	12	39.68	142½	34x4½
Brewster	7700	4	25.60	125	34x4½
Cunningham, V	5000	8	45.00	130	35x5
Fiat, 56	6500	4	42.03	140	35x5
Jordan Sixty	3000	6	29.40	127	35x4½
Premier, 6 B	3150	6	27.34	125½	35x4½
Singer, 17	4600	6	38.40	136	35x5
Standard Eight, F	...	8	33.80	127	35x4½
Stearns, L 4	2900	4	22.50	119	34x4
Stearns, 8	3500	8	33.80	123	35x4½

LANDAULETS

Biddle, D, Town Car	$3850	4	22.50	122	32x4
Biddle, D, Town Car	3900	4	22.50	122	32x4
Brewster, Town Landaulet	7600	4	25.60	125	34x4½
Locomobile, 38, R-7	5700	6	43.35	139	37x5
Locomobile 38, R-7, Berline	5900	6	43.35	139	37x5
Locomobile 48, M-7	6800	6	48.60	142	37x5
Locomobile 48, M-7, Berline	6800	6	48.60	142	37x5
Marmon 34	4650	6	33.75	136	35x5
Owen Magnetic, M-25	4400	6	29.40	125	34x4½
Owen Magnetic, O-36	5000	6	33.75	136	35x5
Pierce-Arrow, 48 B 4 Landau	6420	6	48.60	142	37x5
Pierce-Arrow, 48 B 4, Suburban Landau	6420	6	48.60	142	37x5
Pierce-Arrow, 48 B 4, Vestibule Landau	6660	6	48.60	142	37x5
Pierce-Arrow, 48 B 4, Vestibule Suburban Landau	6660	6	48.60	142	37x5
Pierce-Arrow, 38 C 4	5870	6	38.40	134	36x4½
Pierce-Arrow, 38 C 4, Brougham-Landaulet	5870	6	38.40	134	36x4½
Pierce-Arrow, 38 C 4, Vestibule Landaulet	6050	6	38.40	134	36x4½
Pierce-Arrow, 38 C 4, Vestibule Brougham-Landaulet	6050	6	38.40	134	36x4½
Pierce-Arrow, 38 C 4, French Brougham-Landaulet	5870	6	38.40	134	36x4½
Pierce-Arrow, 66 A 4, Suburban Landau	7420	6	50.00	147½	38x5½
Singer, 17	4700	6	38.40	136	35x5
Stearns, 8	3600	8	33.80	123	35x4½
White, 16-Valve 4	5800	4	28.90	137½	37x5
Winton Six, 33	3900	6	33.75	128	36x4½
Winton Six, 48	4750	6	48.60	138	37x5

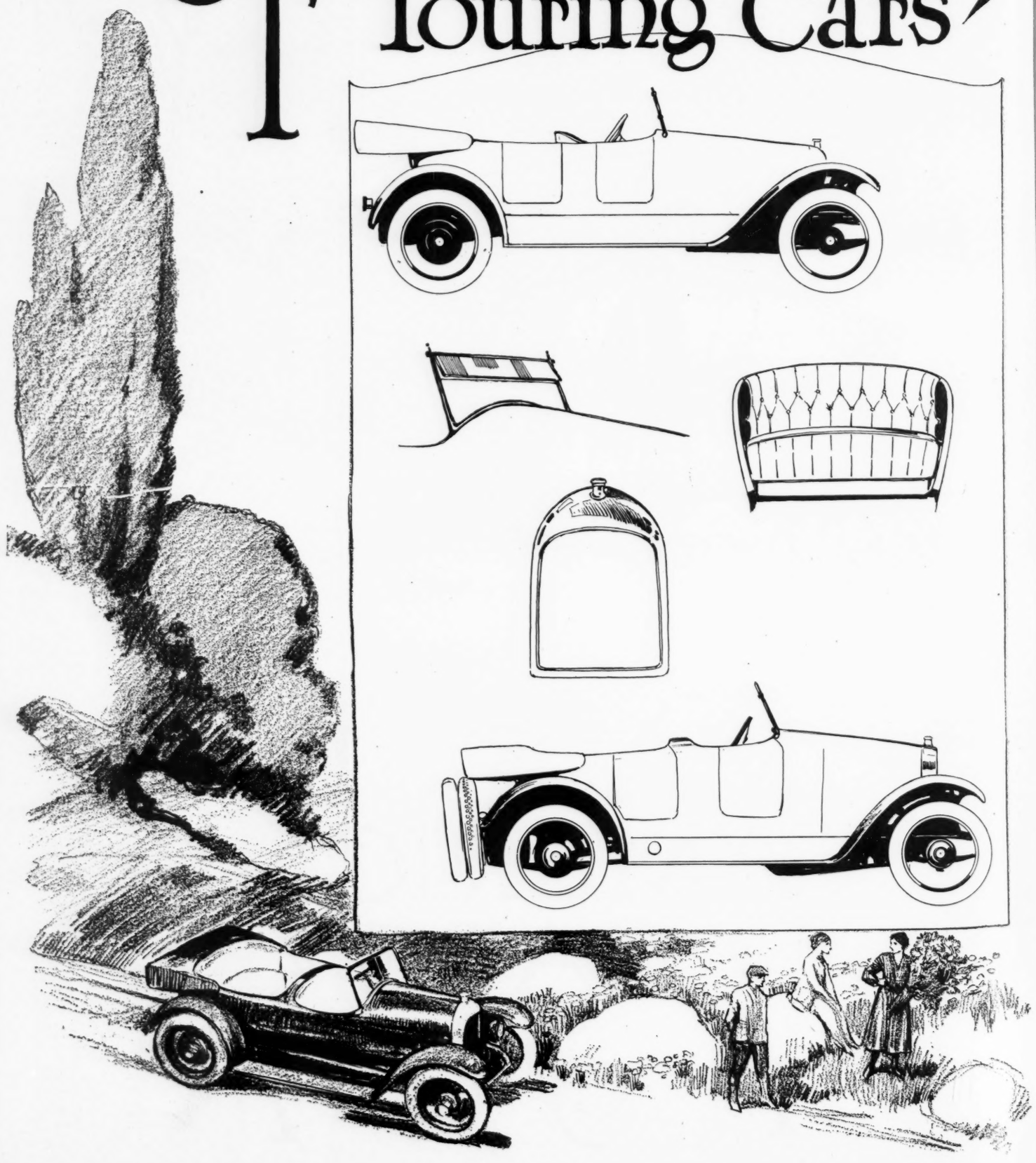
BROUGHAMS AND TOWN CARS

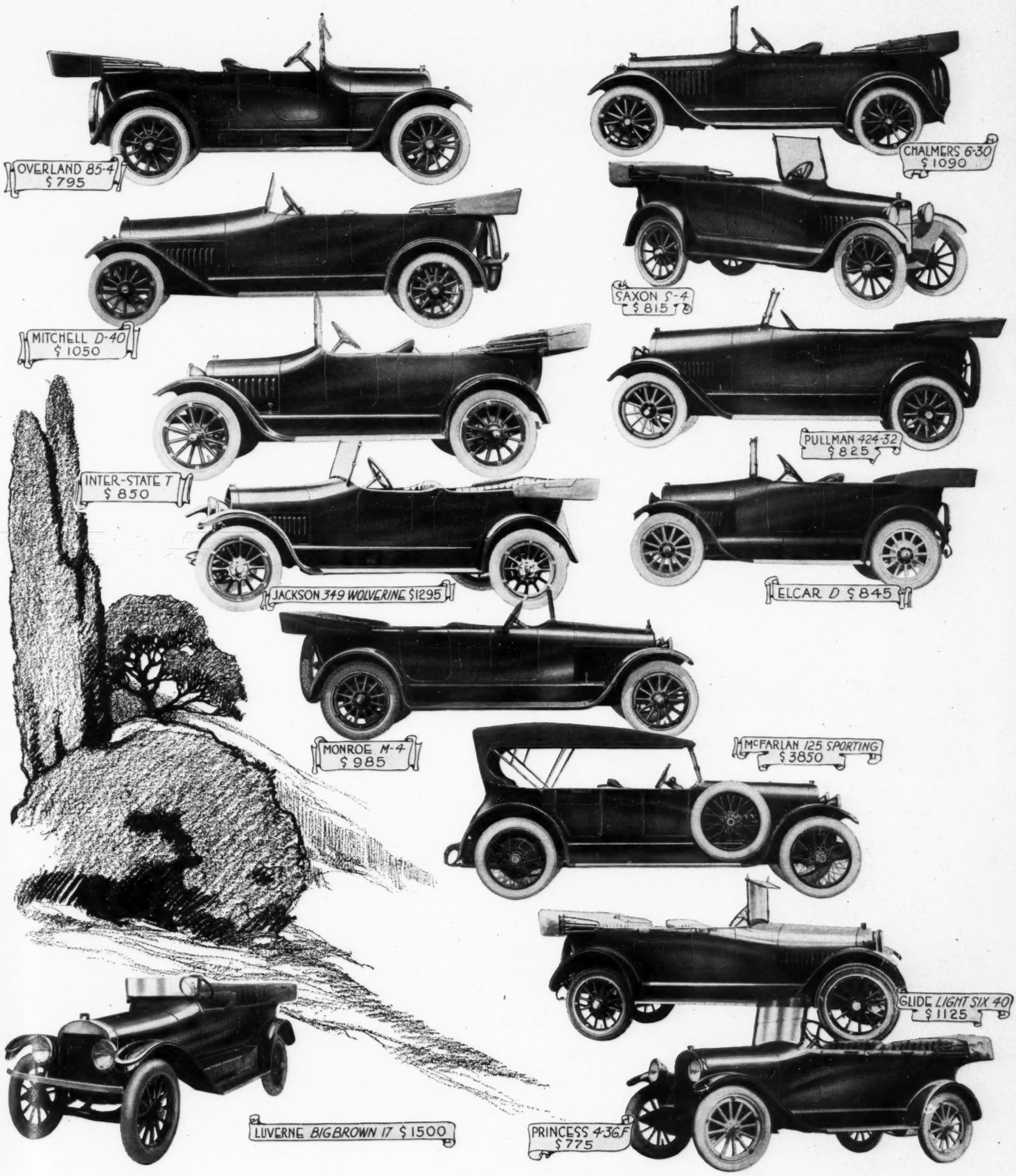
Aland, Town Car	$2300	4	14.40	122	33x4
Brewster	7500	4	25.60	125	34x4½
Chalmers, 6-30, Town Car	2550	6	25.35	122	34x4
Hal Twelve	4250	12	39.68	135	34x4½
Kissel, Victoria Town Car, 100 Point Six	1850	6	25.25	117	32x4
Maxwell, 25, Town Car	915	4	21.03	103	30x3½
McFarlan Six, Town Car, 131	4600	6	48.60	136	35x5
Packard, 2-35	4950	12	43.20	135	35x5
Packard, 2-25	4500	12	43.20	126	35x5
Pierce-Arrow, 48	6180	6	48.60	142	37x5
Pierce-Arrow, 38	5870	6	38.40	134	36x4½
Pierce-Arrow, 66 A 4	7180	6	60.00	147½	38x5½
Premier, 6B Town Car	3150	6	27.34	125½	35x4½
Studebaker, 6-50, Town Car	2750	6	36.04	122	34x4
Velie Biltwel Six, Town Car	2200	6	25.35	115	32x4



MADE IN AMERICA "CARS" 1917

Five Passenger Touring Cars

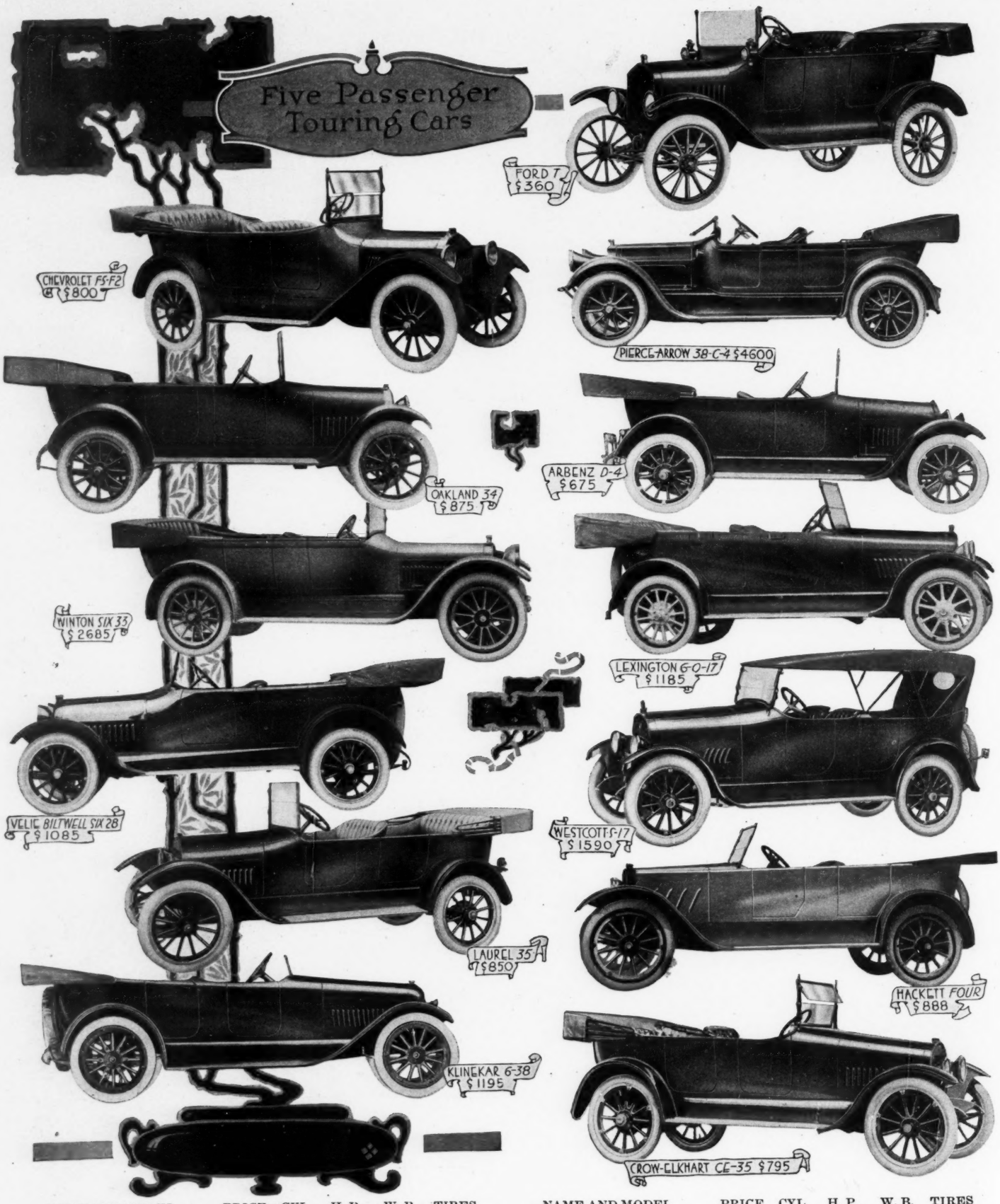




NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Chalmers, 6-30	$1090	6	25.35	115	32x4
Elcar, D	845	4	19.60	115	32x3½
Glide, Six-40	1125	6	23.44	119	34x4
Inter-State, T	850	4	19.60	110	33x4
Inter-State, T	895	4	19.60	110	33x4
Jackson, Wolverine	1295	8	28.80	118	34x4
Luverne, 17	1500	6	33.75	132	35x4½
*McFarlan, 125 Sporting	3800	6	48.60	136	35x5
*Mitchell, D-40	1150	6	25.35	120	32x4

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Mitchell, C-43	$1425	6	29.40	127	34x4
Monroe, M-4	985	4	16.90	115	32x4
Overland, 85-4	795	4	27.23	112	32x4
Overland 85-6	925	6	25.35	116	32x4
*Saxon, S-4	865	6	19.84	112	32x3½
Princess 4-36, F	775	4	22.50	108	32x3½
Pullman, 424-32	825	4	22.50	114	31x4

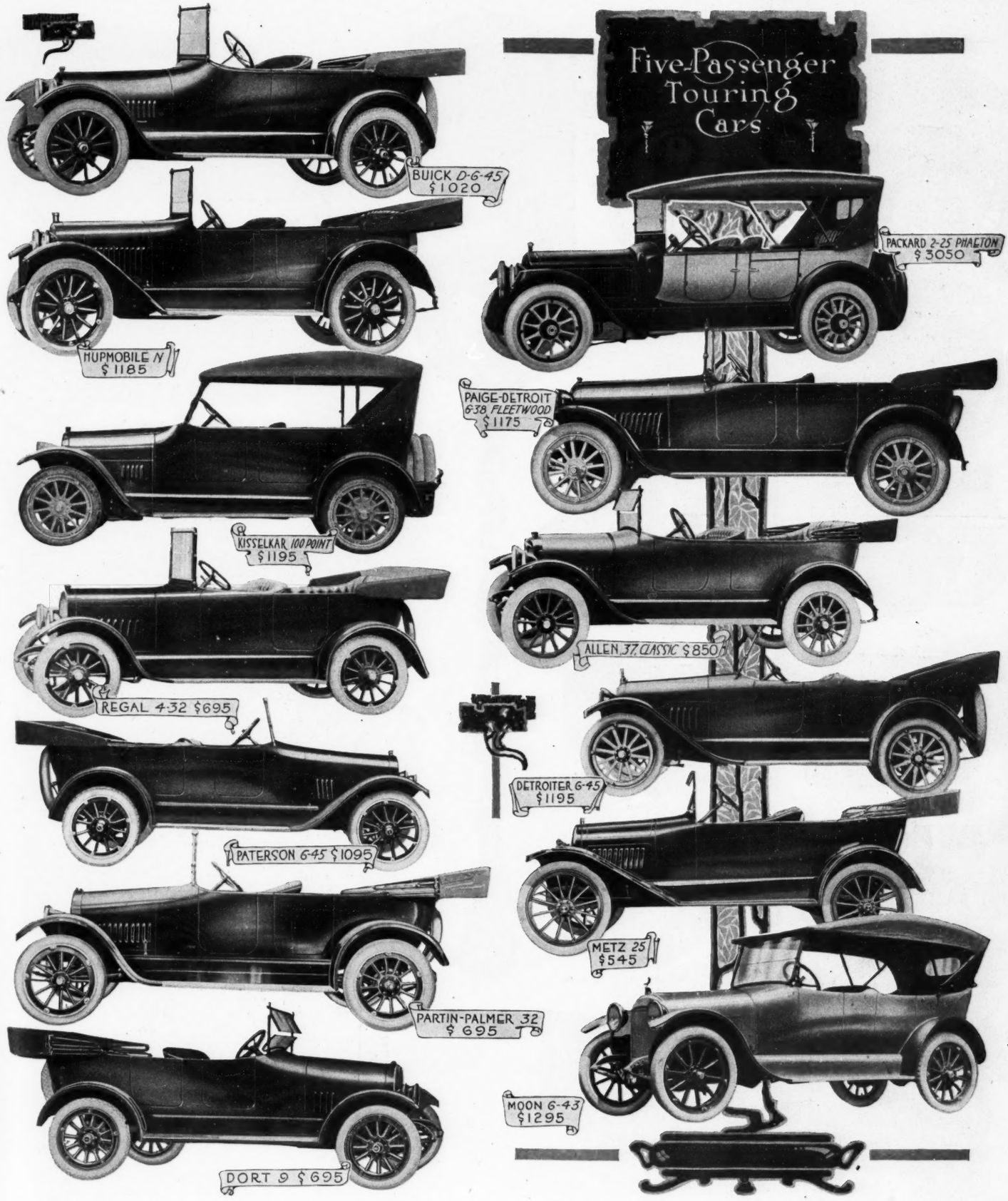
*Later price than shown in illustration.



NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Arbenz, D-4	$ 675	4	16.90	108	30x3½
Chevrolet, F5	800	4	21.76	112	32x3½
Chevrolet, 490	490	4	21.76	102	30x3½
Crow-Elkhart, CE-35	795	4	19.60	113	32x3½
Ford, T	360	4	22.50	100	30x3½
Hackett Four	888	4	22.50	112	31x4
KlineKar, 6-38	1195	6	25.35	120	34x4
Laurel, 35	850	4	22.50	112	....
Lexington, 6	1185	6	25.35	116	32x4
Oakland, 34	875	6	18.99	112	32x4

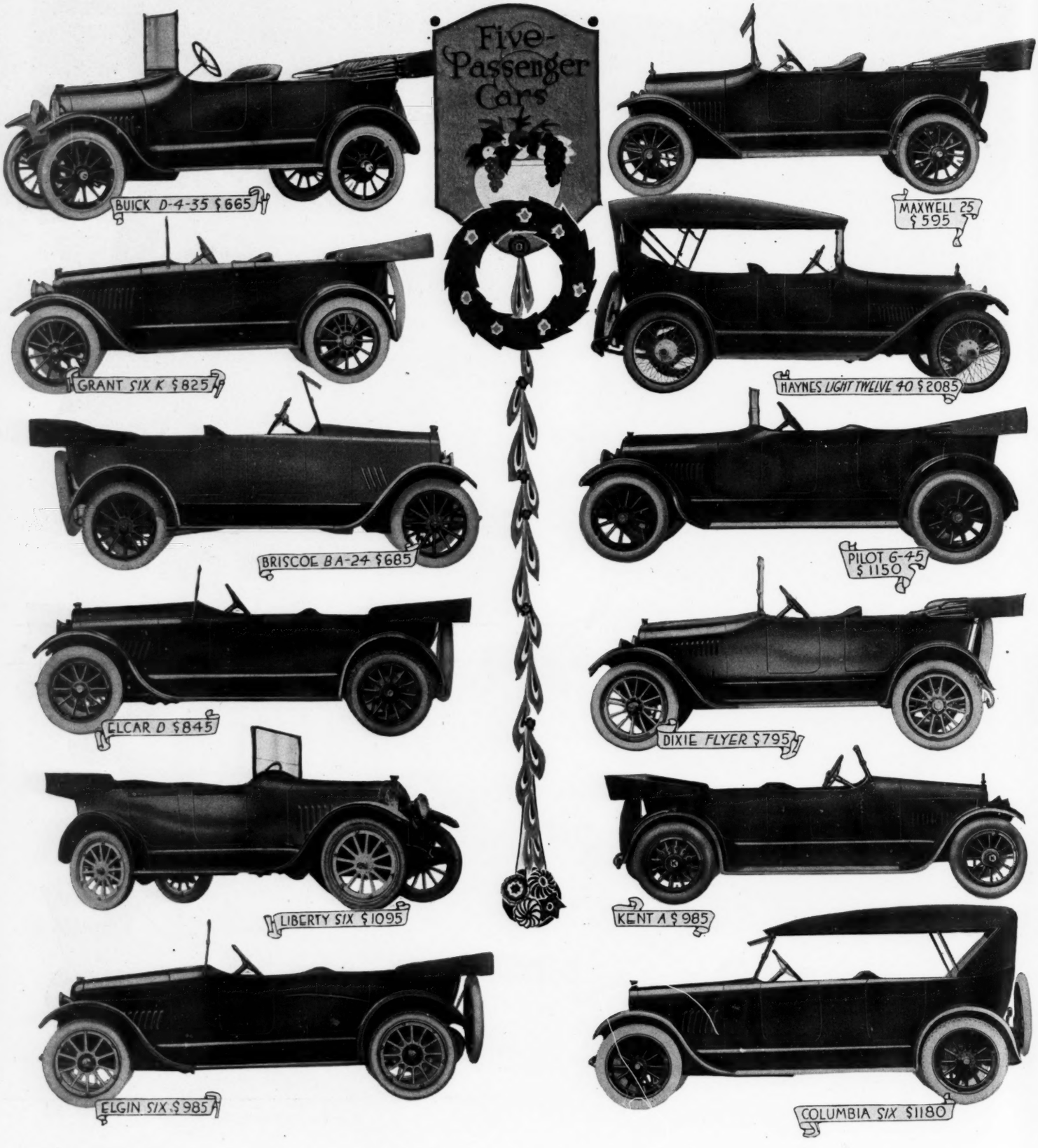
NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Pierce-Arrow, 38	$4600	6	38.40	134	36x4½
Pierce-Arrow, 66	5900	6	60.00	147½	38x5½
Pierce-Arrow, 48	4900	6	48.60	142	37x5
*Velie Biltwell Six, 28	1135	6	25.35	115	32x4
Westcott, S-17	1590	6	29.40	125	35x4½
Winton Six, 33	2685	6	33.75	128	36x4½
Winton Six, 48	3500	6	43.35	138	37x5

*Later price than shown in illustration.



NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Allen, 37, Classic	$ 850	4	22.50	112	32x3½
*Buick, D-6-45	1070	6	25.35	115	34x4
Detroiter, 6-45	1195	6	25.35	119	33x4
Dort, 9	695	4	16.90	105	30x3½
Hupmobile, N	1185	4	22.50	119	34x4
KisselKar, 100 Point	1195	6	25.35	117	32x4
KisselKar, 6-42	1650	6	31.54	128	34x4
Metz, 25	545	4	24.03	108	32x3½
Moon, 6-43	1295	6	25.35	118	33x4
Packard, 2-25, Phaeton	3050	12	43.20	126	35x5
Packard, 2-25, Salon Phaeton	$3050	12	43.20	126	35x5
Packard, 2-35, Phaeton	3500	12	43.20	135	35x5
Packard, 2-35, Salon Phaeton	3500	12	43.20	135	35x5
Paige, 6-38, Fleetwood	1175	6	23.44	117	32x4
Partin-Palmer, 32	695	4	19.60	110	32x3½
Paterson, 6-45	1095	6	25.35	117	32x4
Regal, 4-32	695	4	19.60	108	30x3½
Regal, F	1025	8	28.80	115	33x4

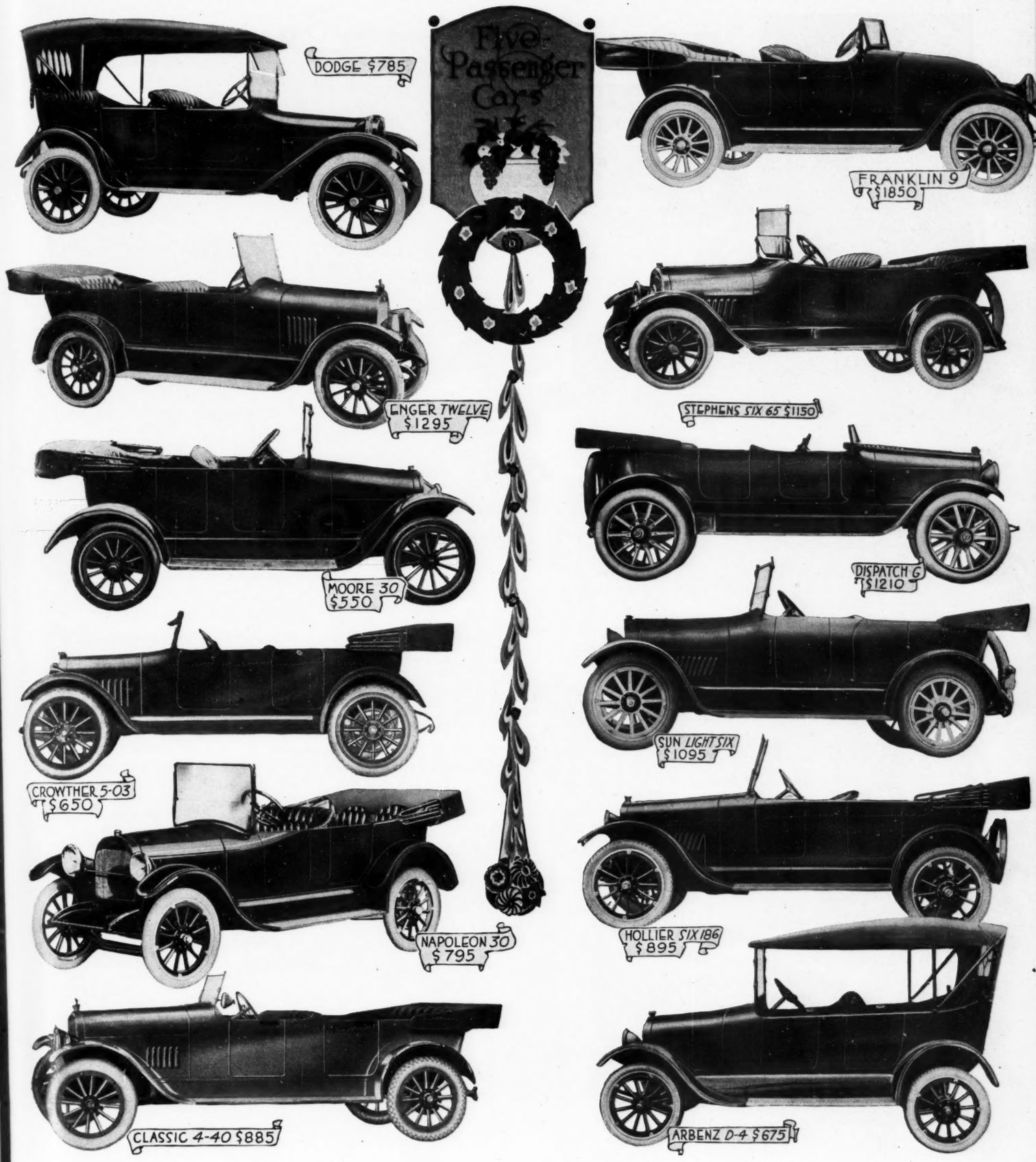
*Later price than shown in illustration.



NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Briscoe, B A-24	$ 685	4	15.20	105	30x3½
*Buick, D-4-35	675	4	18.23	106	31x4
Columbia Six	1180	6	25.35	115	32x4
Dixie Flyer	795	4	16.90	112	32x3½
Elcar, D	845	4	19.60	115	32x3½
Elgin Six	985	6	21.60	116	33x4
Grant Six, K	825	6	21.60	112	32x3½
Haynes Twelve, 40	2085	12	36.30	121	34x4½

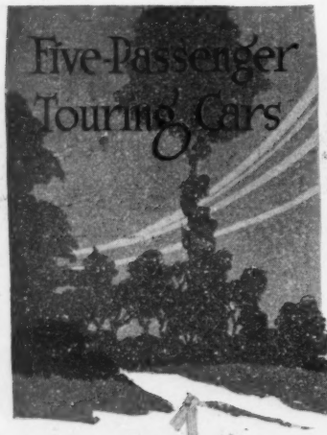
NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Haynes Six, 36	$1585	6	29.40	121	34x4
Kent, A	985	4	22.50	116	32x4
Liberty Six	1095	6	23.44	115	32x4
Maxwell, 25	595	4	21.03	103	30x3½
Pilot, 6-45	1150	6	23.44	119	32x4

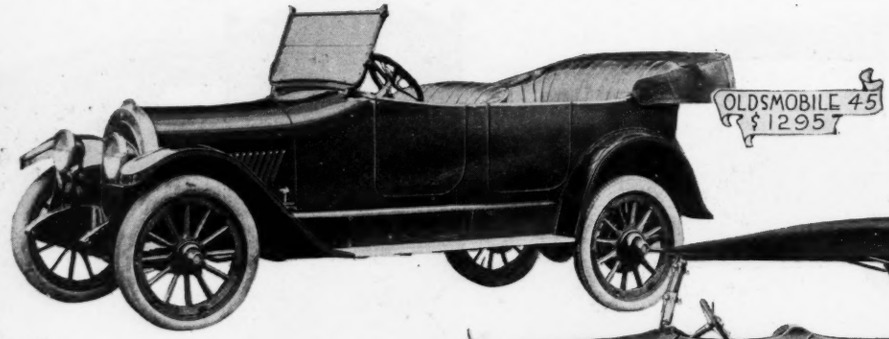
* Later price than shown in illustration.

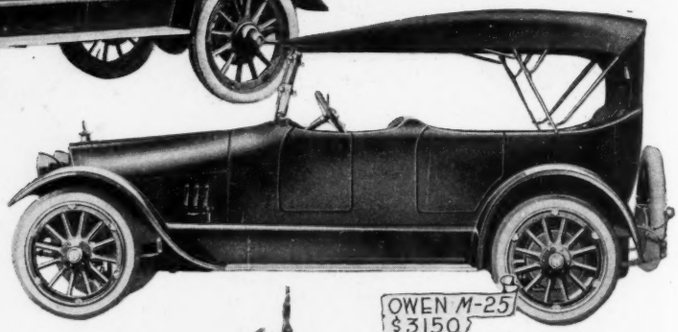


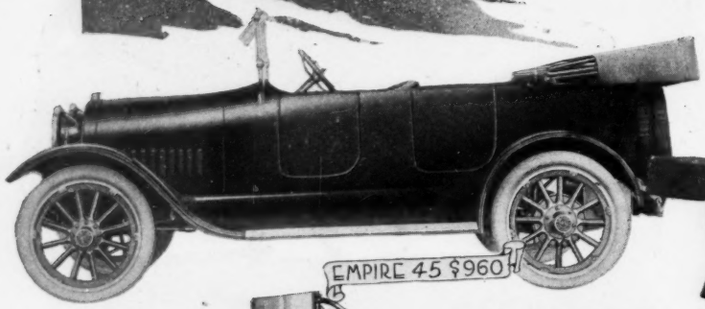
NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Arbenz, D-4	$ 675	4	16.90	108	30x3½
Classic, 4-40	885	4	19.60	114	32x4
Crowther, 5-03	650	4	22.50	110	30x3
Dispatch, G	1210	4	22.50	120	36x3½
Dodge	785	4	24.03	114	32x3½
Enger Twelve	1295	12	34.75	116	32x4
Hollier Six, 186	895	6	21.60	116	32x3½

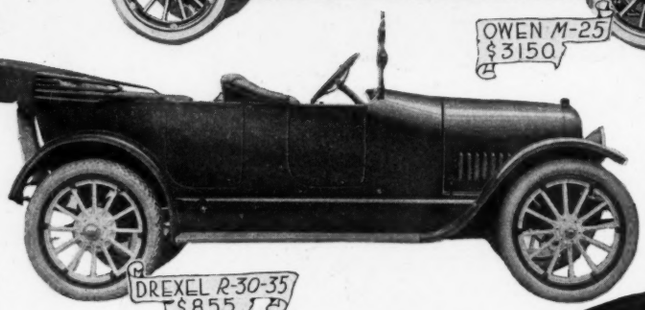
NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Hollier Six, 178	$1185	8	28.80	116	34x4
Moore, 30	550	4	22.50	106	30x3½
Napoleon, 30	795	4	19.60	112	31x4
Overland, 85-4	795	4	27.23	112	32x4
Overland, 85-6	925	6	25.35	116	32x4
Stephens Six, 65	1150	6	25.35	115	32x4
Sun Six	1095	6	23.44	116	34x4

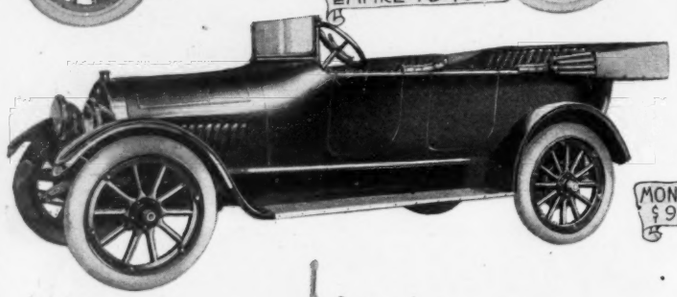


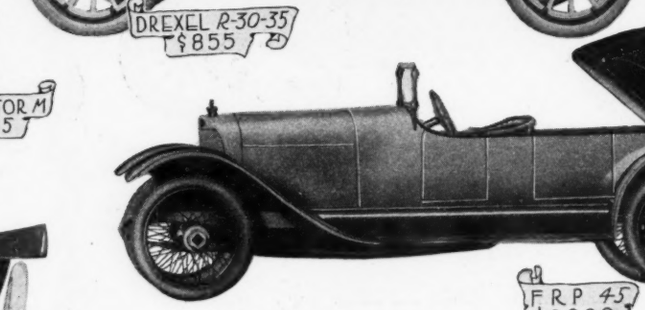


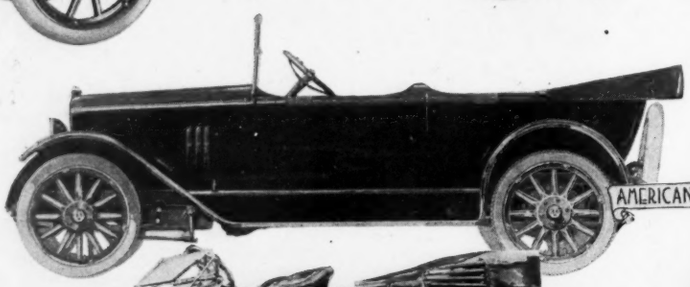


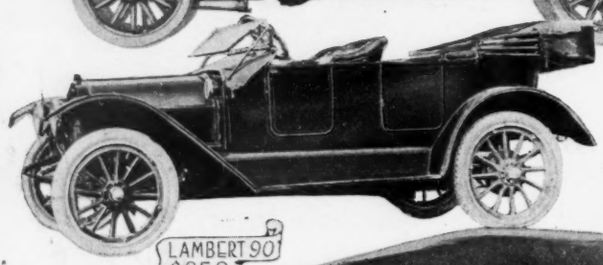


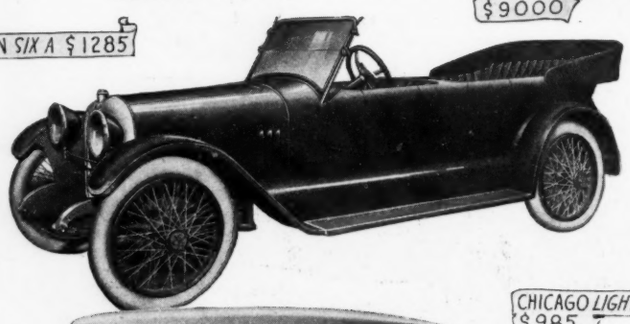


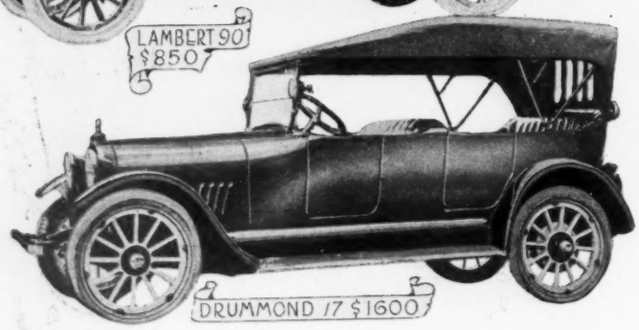


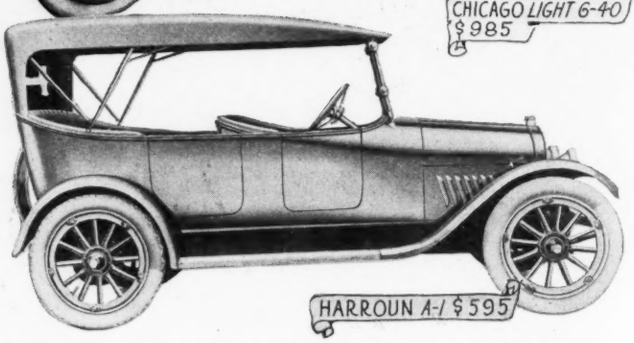








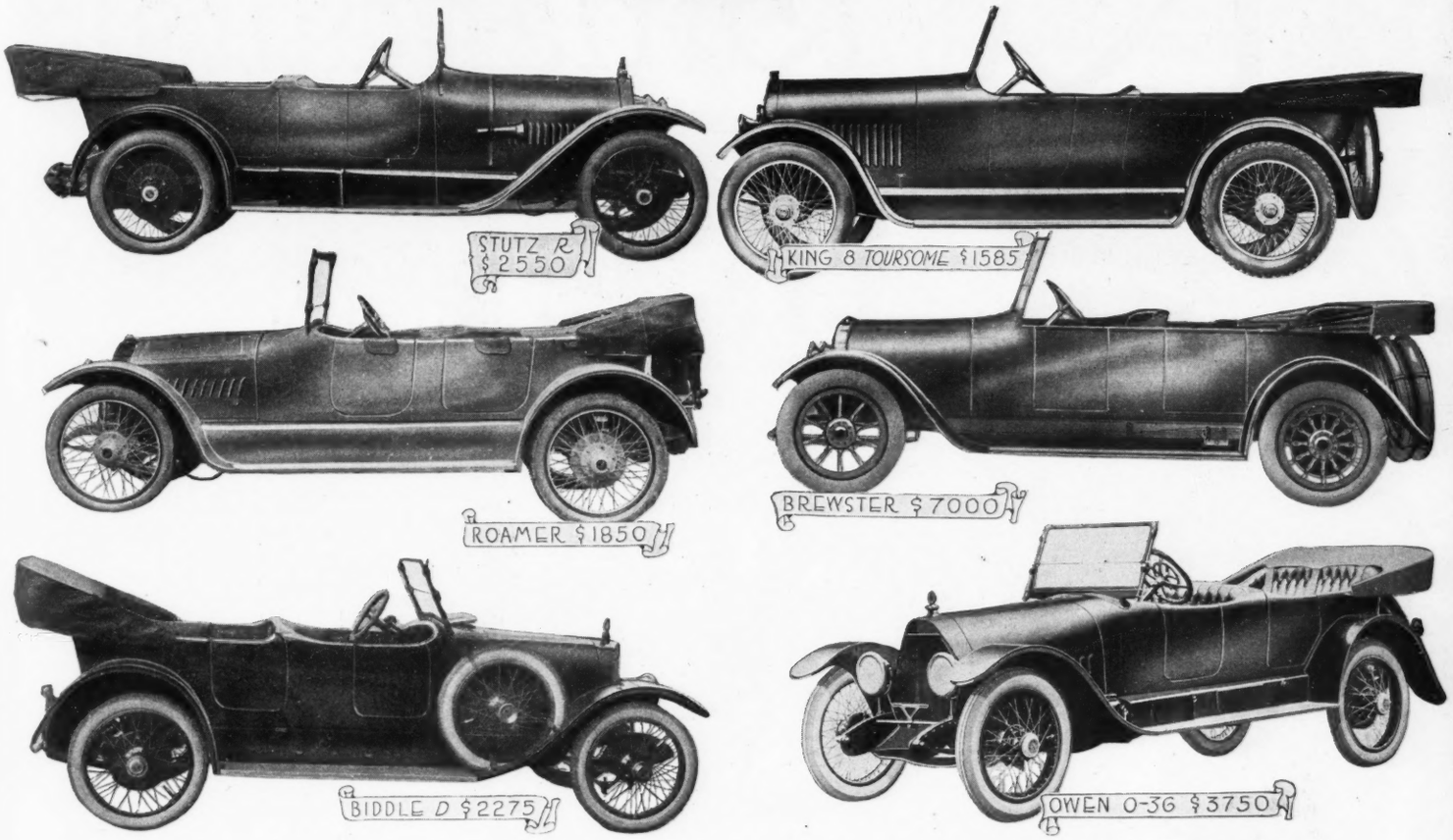




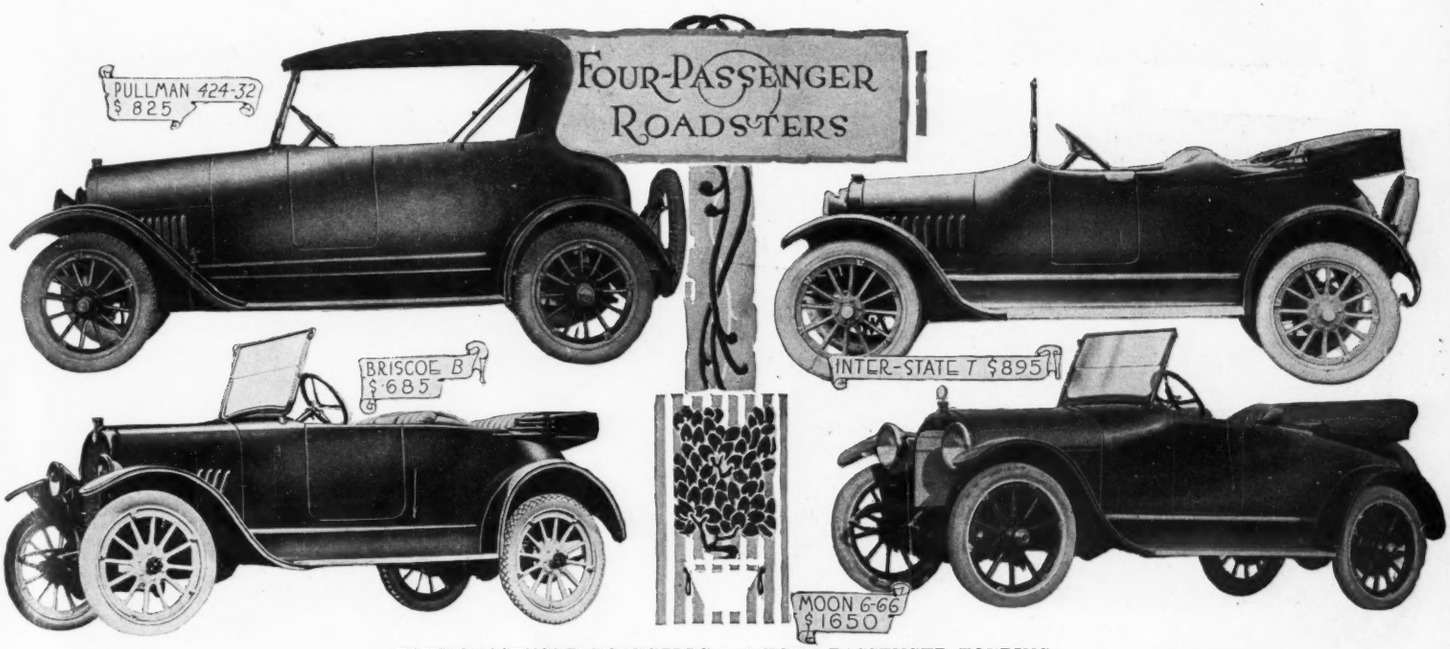
NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
American Six, A	$1285	6	21.60	122	32x4
Chicago, 6-40	985	6	23.44	120	32x4
Drexel, R-30-35	855	4	19.60	112	33x4
Drummond, 17	1600	8	28.80	120	34x4
Empire, 45	960	4	24.03	116	33x4
Empire, 70	...	6	25.35	120	34x4
F R P, 45	9000	4	33.86	140	36x5

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Harroun, A-1	$ 595	4	16.90	107	30x3½
Lambert, 90	850	4	28.90	115	34x3½
Lambert, 80	985	6	25.35	112	33x4
Monitor, M	995	6	25.35	115	33x4
Monitor, C	795	4	22.50	108	32x3½
Oldsmobile, 45	1295	8	26.45	120	33x4
Owen Magnetic, M-25	3150	6	29.40	125	34x4½

FOUR-PASSENGER TOURING CARS



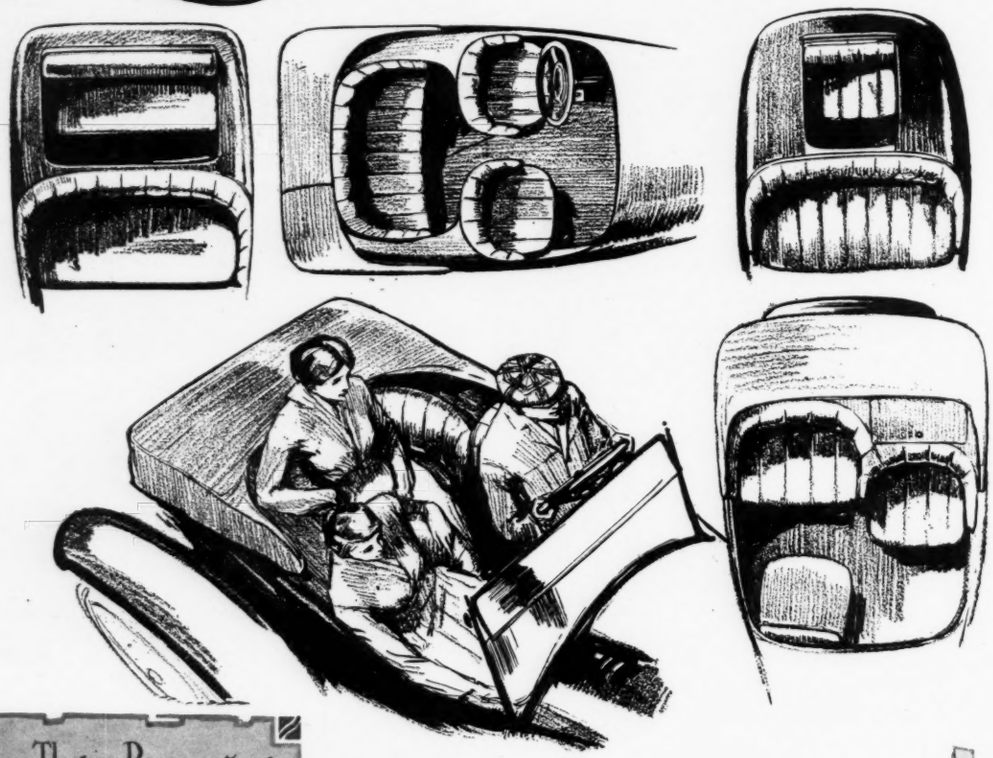
FOUR-PASSENGER ROADSTERS



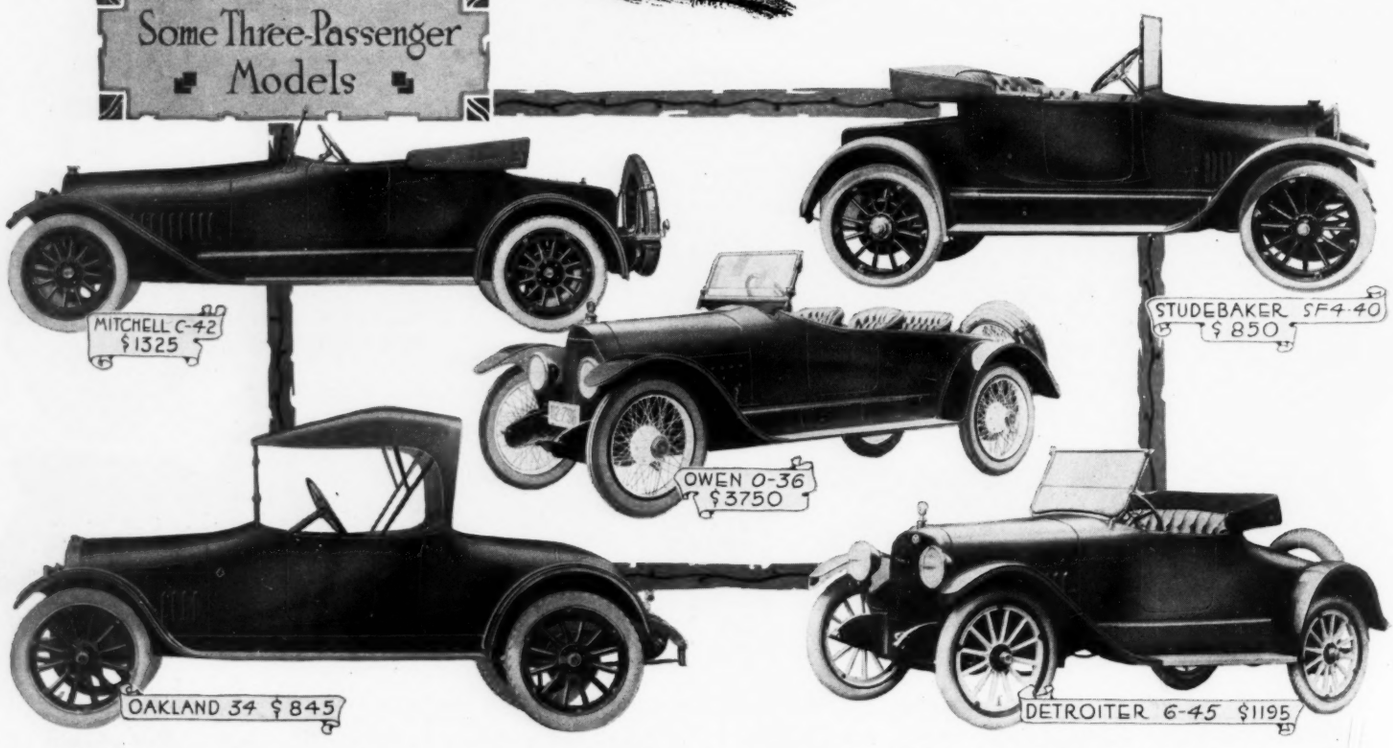
FOUR PASSENGER ROADSTERS and FOUR PASSENGER TOURING

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Biddle, D, Touring Car	$2275	4	22.50	122	32x4
Brewster, Open Phaeton	7000	4	25.60	125	34x4½
Brewster Runabout	6500	4	25.60	125	34x4½
Briscoe, B A-24	685	4	15.20	105	30x3½
Inter-State, T	895	4	19.60	110	33x4
King 8, Foursome	1585	8	28.80	120	34x4
Moon, 6-66, Club	$1650	6	29.40	125	35x4½
Owen Magnetic, 0-36, Touring	3750	6	33.75	136	35x5
Pullman, 424-32	825	4	22.50	114	31x4
Roamer	1850	6	23.44	124	34x4
Stutz, R, Bull Dog Special	2550	4	36.10	130	34x4½

Roadsters and Runabouts



Some Three-Passenger Models



NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Detroiter, 6-45	$1195	6	25.35	119	33x4
*Mitchell, C-42	1425	6	29.40	127	34x4
*Oakland, 34	875	6	18.99	112	32x4
Owen, Mag. O-36, Cloverleaf	3750	6	33.75	136	35x5

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
*Studebaker, 4-40	$ 930	4	24.03	112	34x4
Studebaker, 6-50	1170	6	36.04	122	34x4

*Later price than shown in illustration.

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Apperson Roadaplane, 8-17, Chummy	$2000	8	31.25	130	35x4½
Apperson Roadaplane, 6-17, Chummy	1750	6	29.40	130	34x4
Auburn, 6-39, Chummy	1085	6	23.44	120	34x4
Cadillac, 55, Club	2080	8	31.25	125	36x4½
*Cole Tuxedo, 861	1695	8	39.20	127	35x4½
Elgin Six	985	6	21.60	116	33x4
Jackson, Wolverine	1395	8	28.80	118	34x4

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Laurel, 35, Cloverleaf	$ 895	4	22.50	112	....
Liberty Six, Close-Coupled	1095	6	23.44	115	32x4
Marmon, 34, Club	3100	6	33.75	136	34x4½
Paterson	1095	6	25.35	117	32x4
Pilot, 6-45	1150	6	23.44	119	32x4
Premier	1895	6	27.34	125½	35x4½
Standard Eight, Cloverleaf	1850	8	28.80	...	35x4½

* Later price than shown in illustration.

Four-Passenger Roadsters

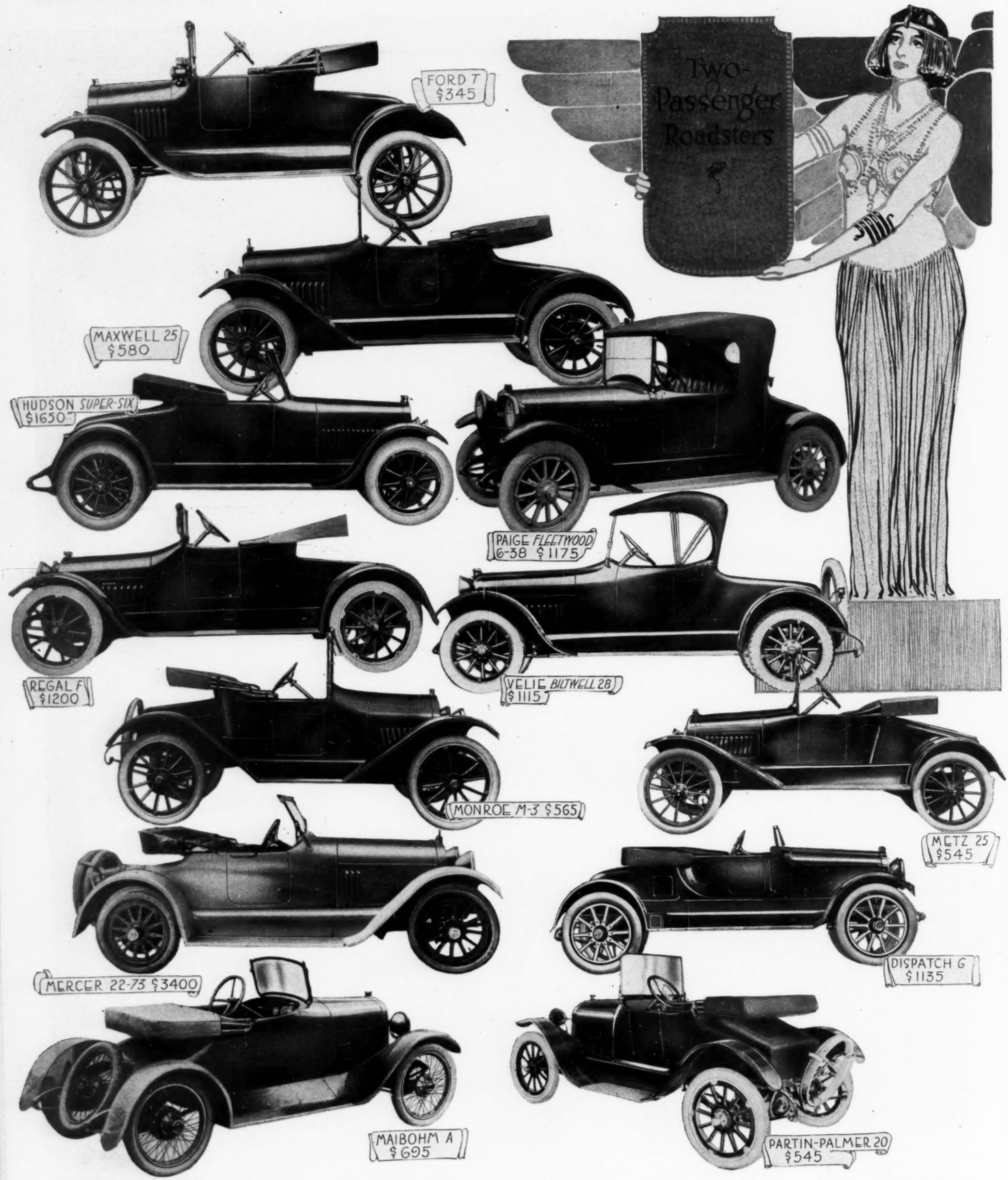
NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Anderson, 6-40	$1275	6	25.35	120	33x4
Ben-Hur, Cloverleaf	1875	6	29.40	126	35x4½
Chandler, 17	1395	6	27.34	123	34x4
Dixie Flyer, Cloverleaf	795	4	16.90	112	32x3½
Elcar, Cloverleaf	845	4	19.60	115	32x3½
Haynes Six, 36	1585	6	29.40	121	34x4
Haynes Six, 37	$1685	6	29.40	127	35x4½
Haynes Twelve, 41	2185	12	36.30	127	34x4½
KlineKar, 6-38, Shamrock	1195	6	25.35	120	34x4
Scripps-Booth, D	1175	8	22.05	120	32x4
Sun Six	1145	6	23.44	116	34x4
Westcott, S-17, Cloverleaf	1590	6	29.40	125	35x4½

Four-Passenger Roadsters

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
*Austin Highway King	$3750	12	39.68	142½	34x4½
Daniels Eight	2600	8	33.80	127	34x4½
Daniels Eight, Cloverleaf	2700	8	33.80	127	34x4½
Daniels Eight, Close Coupled	2800	8	33.80	127	34x4½
Franklin, Series 9	1850	6	25.35	115	32x4
Hollier Six	1185	8	28.80	116	34x4
Kent, A	985	4	22.50	116	32x4
Locomobile, 38, R-7	4750	6	43.55	139	37x5
Marion-Handley, 6-40	1275	6	23.44	120	32x4

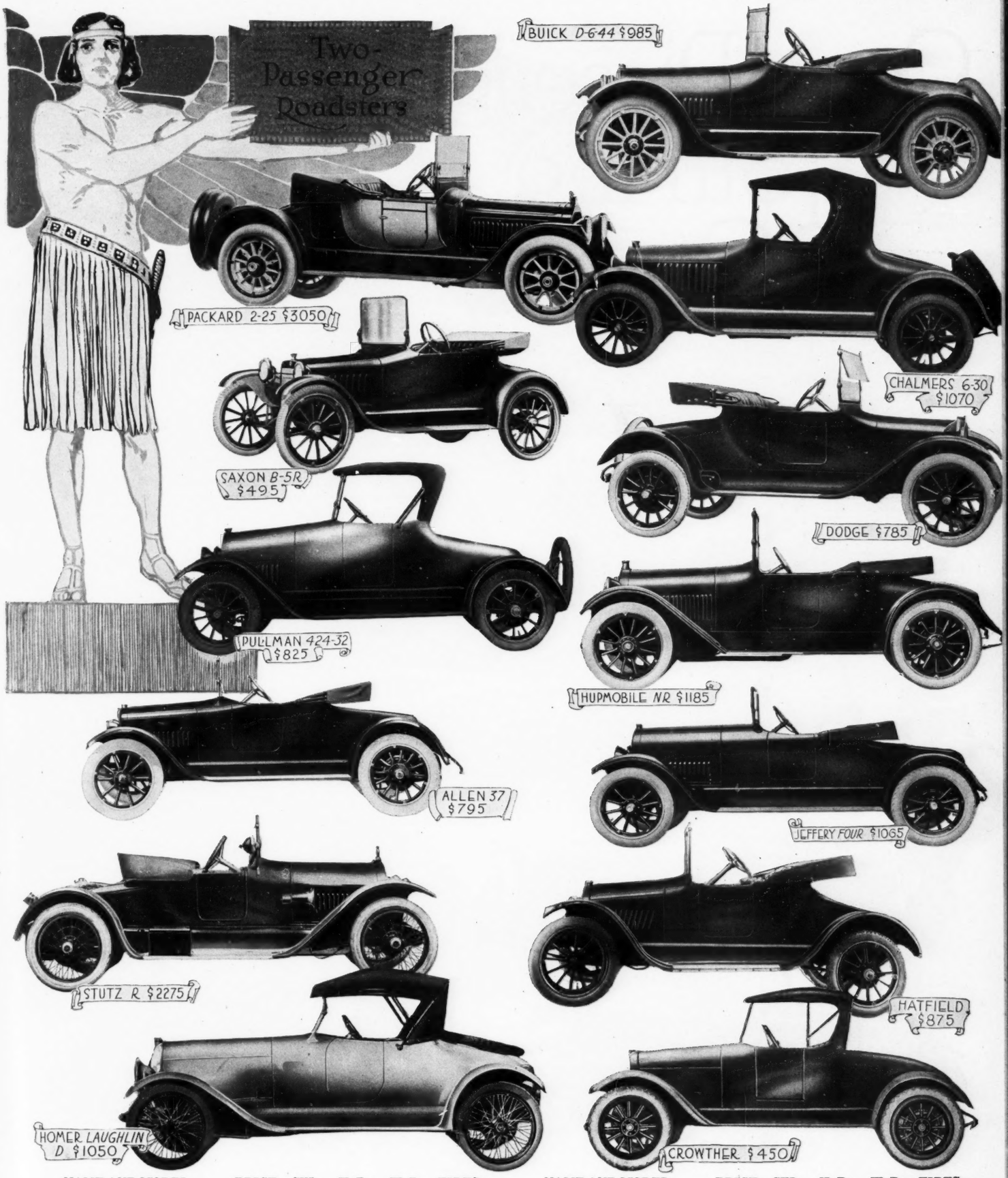
NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Mercer, 22-73, Sporting	$3500	12	22.50	132	34x4½
National Highway Twelve	2150	12	39.68	128	34x4½
National Highway Six	1750	6	29.40	128	34x4½
Ogren Six, 102	2500	6	33.75	132	34x4½
Pathfinder, 2 C	2900	12	39.68	130	35x5
Velie Biltwell Six, 28	1135	6	25.35	115	32x4

*Later price than shown in illustration.



NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Dispatch, G	$1135	4	22.50	120	30x3½
Ford, T	345	4	22.50	100	30x3½
Hudson, Super-Six	1650	6	29.40	125½	35x4½
Maibohm, A	695	4	15.63	105	30x3½
Maxwell, 25	580	4	21.03	103	30x3½
Mercer, 22-73, Runabout	3400	4	22.50	115	32x4
Mercer, 22-73, Raceabout	3250	4	22.50	115	32x4

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Metz, 25	$ 545	4	24.03	108	32x3½
Monroe, M-3	565	4	14.40	96	30x3
Paige, 6-38, Fleetwood	1175	6	23.44	117	32x4
Partin-Palmer, 20	545	4	15.63	96	30x3½
Regal, F, DeLuxe Roadster	1200	8	28.80	115	33x4
Velie Biltwell Six, 28	1115	6	25.35	115	32x4

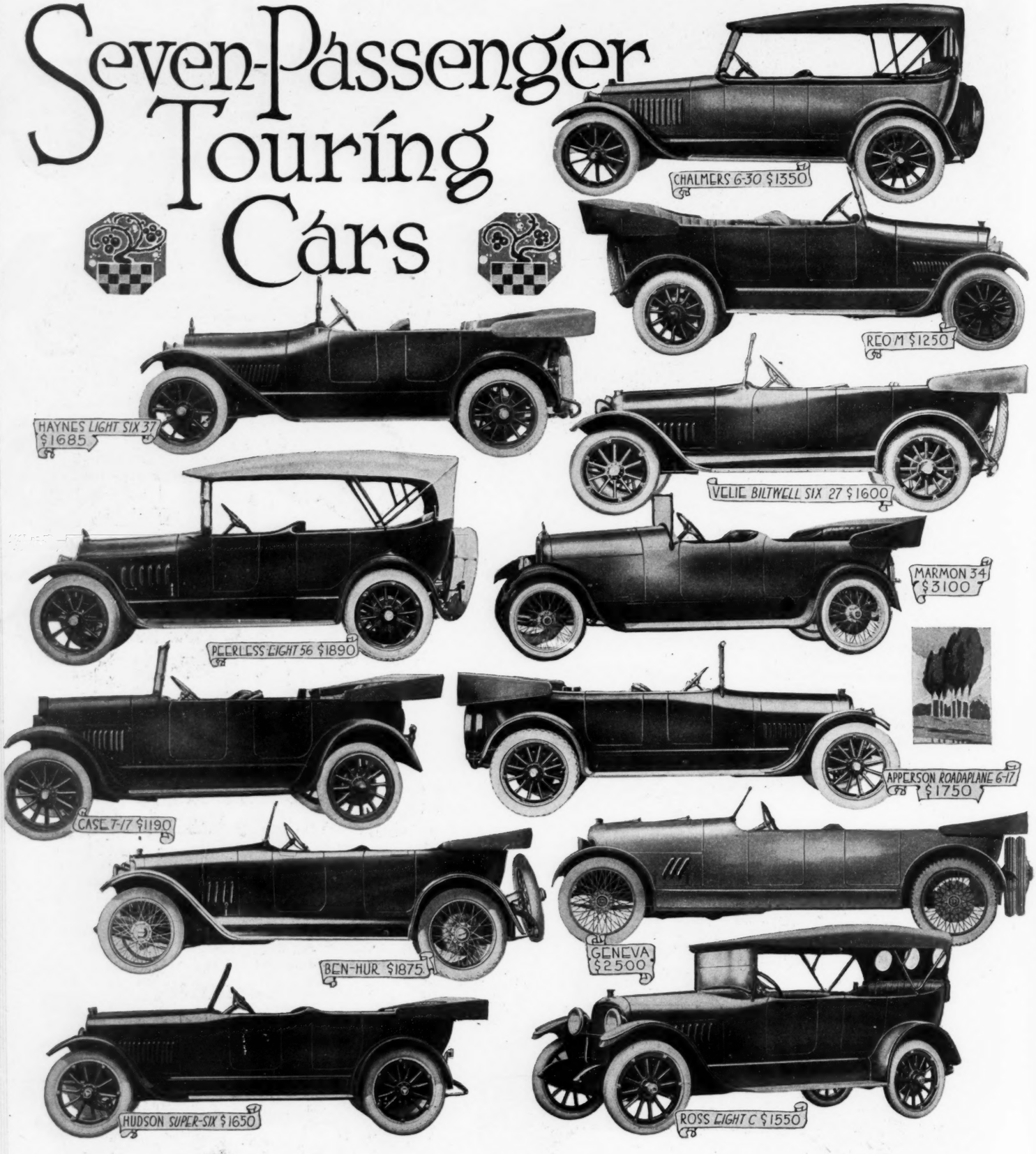


NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
*Buick, D-6-44	1070	6	25.35	115	34x4
Buick, D-4-35	660	4	18.23	106	34x4
Chalmers, 6-30	1070	6	25.35	115	32x4
Crowther	450	4	22.50	110	30x3
Dodge	785	4	24.03	114	32x3½
Hatfield	875	4	22.50	106	31x4
Homer Laughlin, D.	1050	8	16.26	112	30x3½

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Hupmobile, NR	$1185	4	22.50	119	34x4
*Jeffery Four	1335	4	22.50	116	34x4
Packard, 2-25, Runabout	3050	12	43.20	126	35x5
Pullman, 424-32	825	4	22.50	114	31x4
Saxon, B-5 R	495	4	12.10	96	30x3
Stutz, R	2275	4	36.10	130	34x4½

*Later price than shown in illustration.

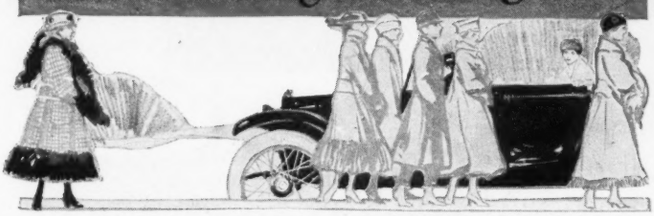
Seven-Passenger Touring Cars

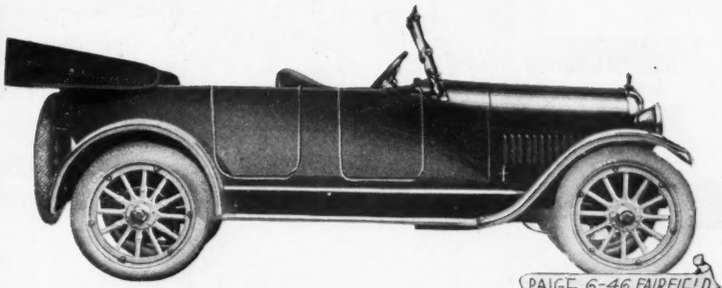


NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Apperson Roadaplane, 6	$1750	6	29.40	130	34x4
Apperson Roadaplane, 8	2000	8	31.25	130	35x4½
Ben-Hur	1875	6	29.40	126	35x4½
Case, T-17	1190	4	21.03	120	34x4
Chalmers, 6-30	1350	6	25.35	122	34x4
Geneva	2500	6	38.40	139	34x4½
Haynes Six, 37	1685	6	29.40	127	35x4½

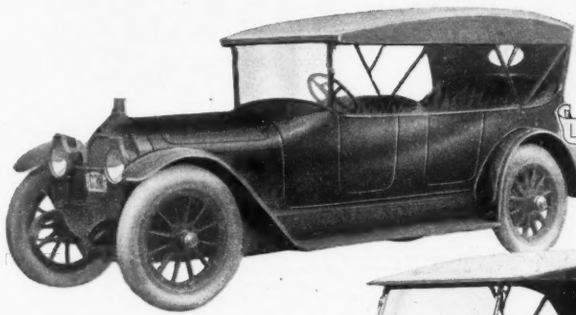
NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Haynes Twelve, 41	$2185	12	36.30	127	34x4½
Hudson Super-Six, Phaeton	1650	6	29.40	125½	35x4½
Marmon, 34	3100	6	33.75	136	34x4½
Peerless Eight, 56	1890	8	33.80	125	35x4½
Reo, M	1250	6	30.46	126	34x4½
Ross Eight, C	1550	8	33.80	130	35x4½
Velie Biltwell Six, 27	1600	6	29.40	124	35x4½

Seven-Passenger Touring Cars

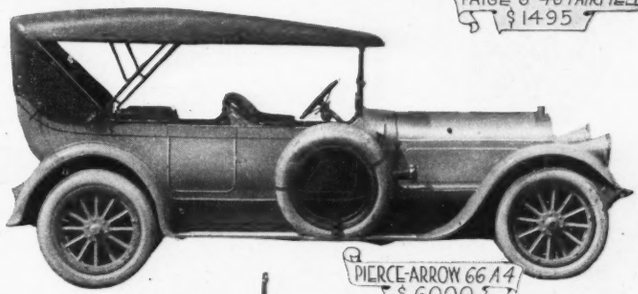




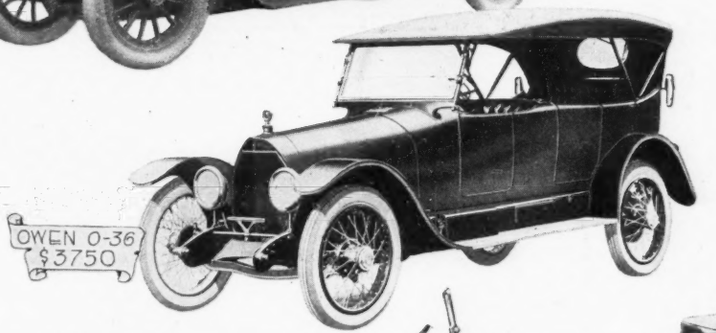
PAIGE 6-46 FAIRFIELD $1495



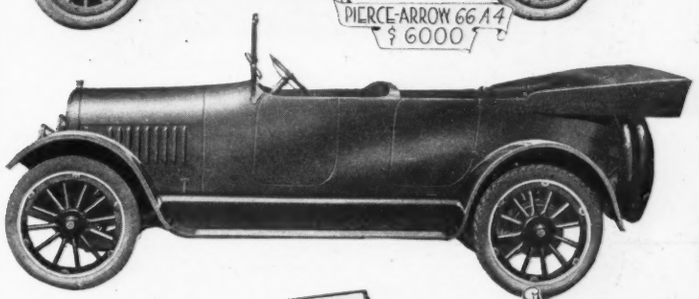
LOCOMOBLE M-7 $5400



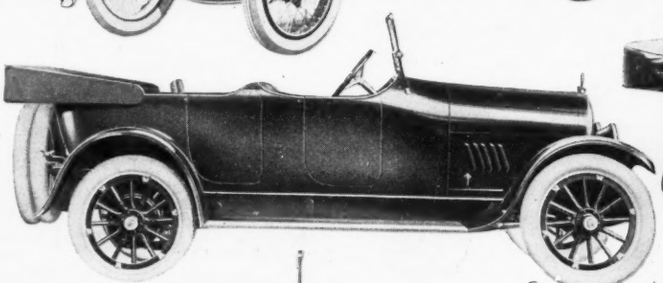
PIERCE-ARROW 66 A4 $6000



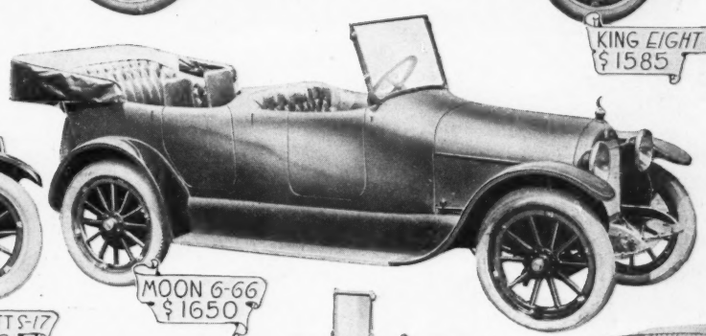
OWEN O-36 $3750



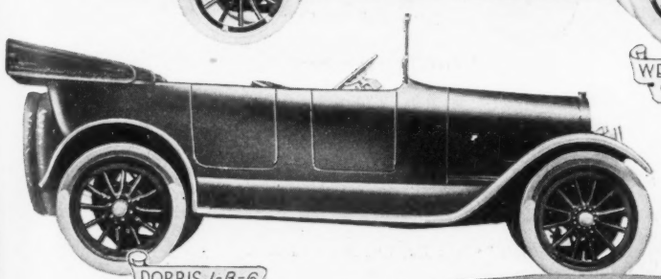
KING EIGHT E $1585



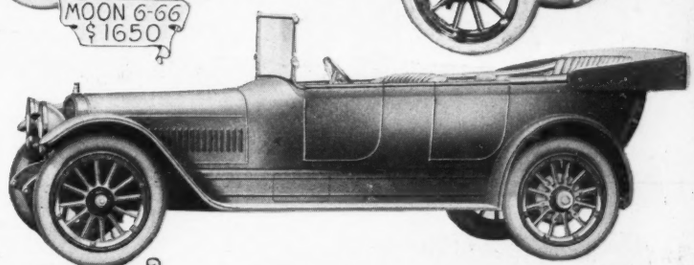
WESTCOTT S-17 $1690



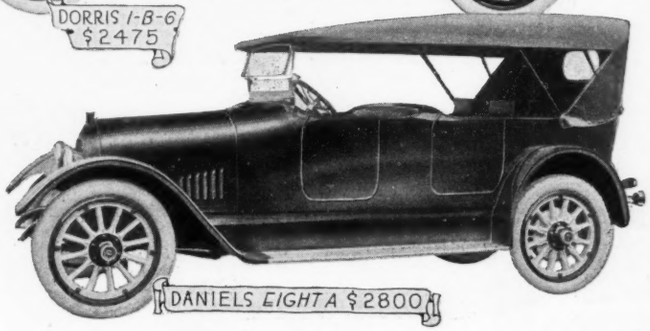
MOON 6-66 $1650



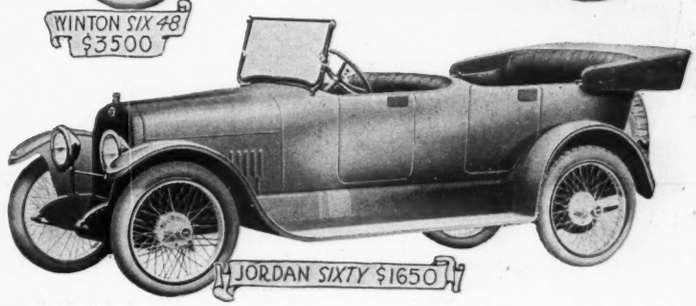
DORRIS I-B-6 $2475



WINTON SIX 48 $3500



DANIELS EIGHT A $2800

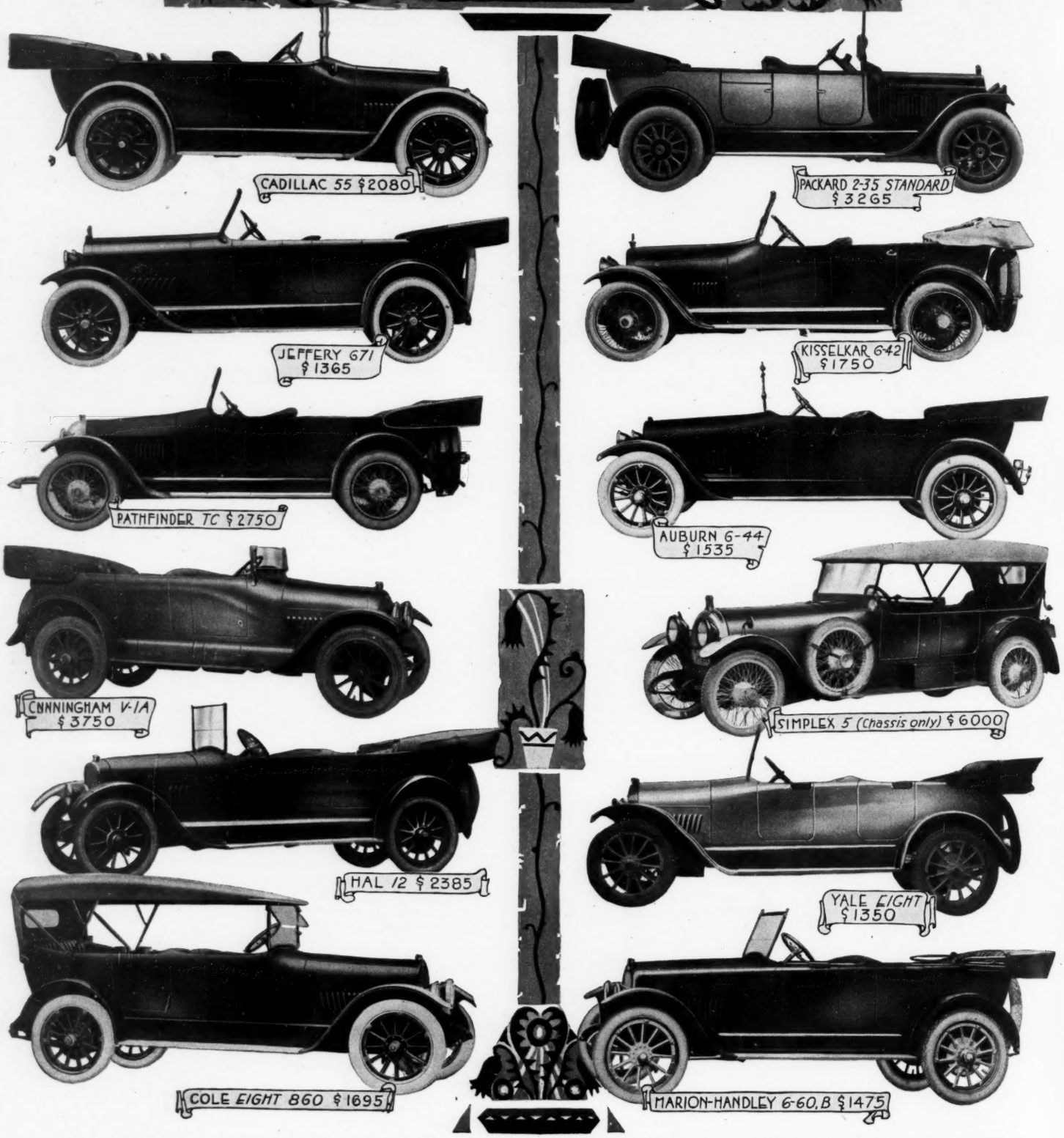


JORDAN SIXTY $1650

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Daniels Eight, A	$2800	8	33.80	127	34x4½
Dorris, I-B-6	2475	6	38.40	128	36x4½
Jordan Sixty	1650	6	29.40	127	35x4½
King Eight, E	1585	8	28.80	120	34x4
Locomobile, M-7	5400	6	48.60	142	37x5
Locomobile, R-7	4600	6	43.35	139	37x5
Moon, 6-66	1650	6	29.40	125	35x4½

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Owen, Magnetic O-36	$3750	6	33.75	136	35x5
Paige, 6-46, Fairfield	1495	6	29.40	124	35x4½
Pierce-Arrow, 66	6000	6	60.00	147½	38x5½
Pierce-Arrow, 48	5000	6	48.60	142	37x5
Westcott, S-17	1690	6	29.40	125	35x4½
Winton Six, 48	3500	6	48.60	138	37x5
Winton Six, 33	2735	6	33.75	128	36x4½

Seven-Passenger Touring Cars

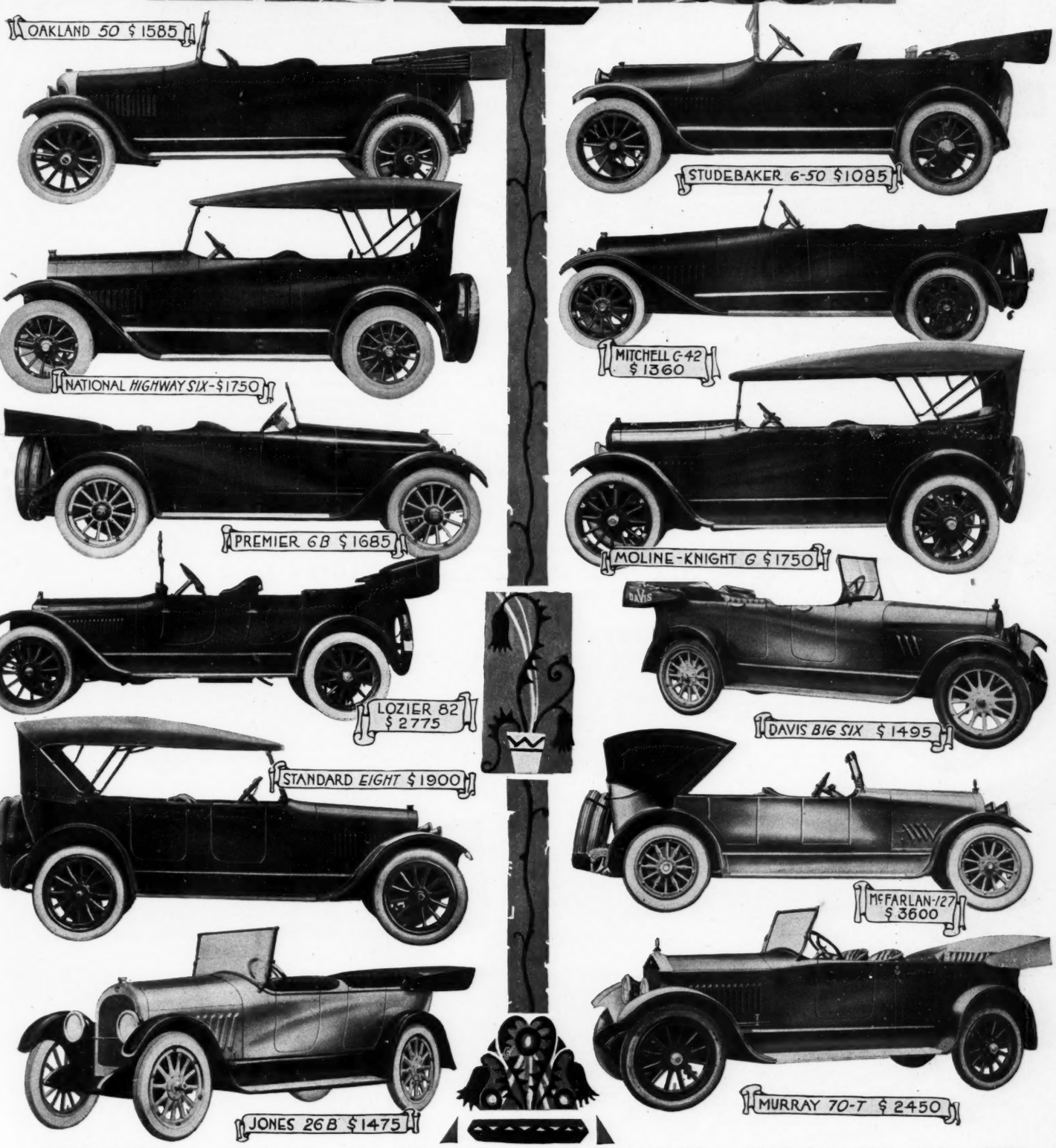


NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Auburn, 6-44	$1535	6	29.40	131	35x4½
Cadillac, 55	2080	8	31.25	125	36x4½
Cole Eight, 860	1695	8	39.20	127	35x4½
Cunningham, V	3750	8	45.00	130	35x5
HAL, 12	2385	12	39.68	135	34x4½
*KisselKar, 6-42	1850	6	31.54	128	34x4
Marion-Handley, 6-60	1475	6	29.40	125	35x4½
Marion-Handley, 6-40	1275	6	23.44	120	32x4

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
*Packard, 2-35, Standard	$3500	12	43.20	135	35x5
Packard, 2-35, Salon	3500	12	43.20	135	35x5
Packard, 2-25, Standard	3050	12	43.20	126	35x5
Pathfinder, T. C	2750	12	39.68	130	35x5
Simplex, 5 (Chassis only)	6000	6	45.94	143½	37x5
Yale Eight	1350	8	31.25	126	....

*Later price than shown in illustration.

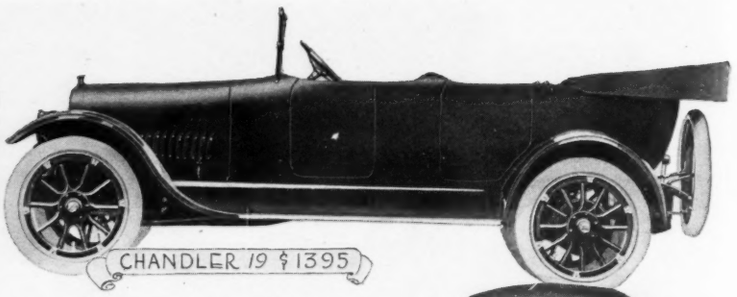
Seven-Passenger Touring Cars

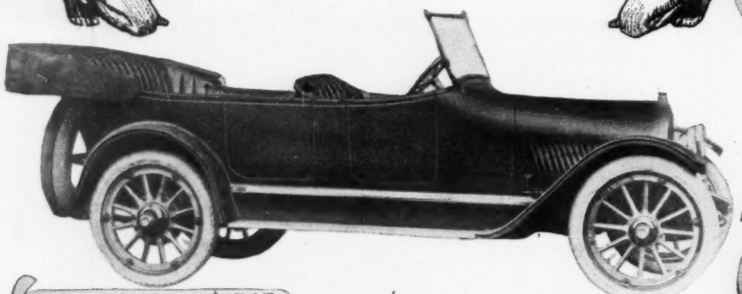


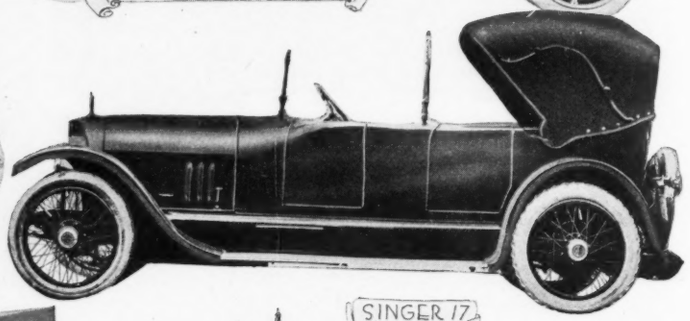
NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Davis, Big Six	$1495	6	29.40	124	34x4½
Davis, Light Six	1195	6	25.35	118	34x4
Jones Six, 26B	1475	6	29.40	125	35x4½
Lozier, 82	2775	6	36.04	132	36x4½
*Mitchell, C-42	1460	6	29.40	127	34x4
*McFarlan Six, 127	3500	6	48.60	136	35x5
Moline-Knight, G	1750	4	25.60	122	35x4½
Murray, 70-T	2450	8	33.80	128	34x4½
National Highway Six	1750	6	29.40	128	34x4½
National Highway Twelve	$2150	12	39.68	128	34x4½
Oakland, 50	1585	8	39.20	127	34x4½
*Premier, 6B	1895	6	27.34	125½	35x4½
Standard Eight	1900	8	33.80	127	35x4½
*Studebaker, 6-50	1180	6	36.04	122	34x4
Studebaker, 4-40	940	4	24.03	112	34x4

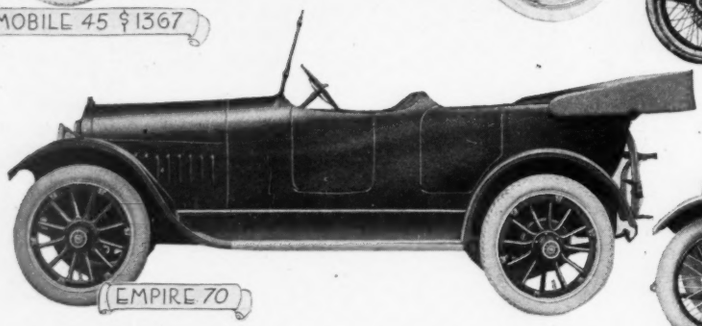
*Later price than shown in illustration.

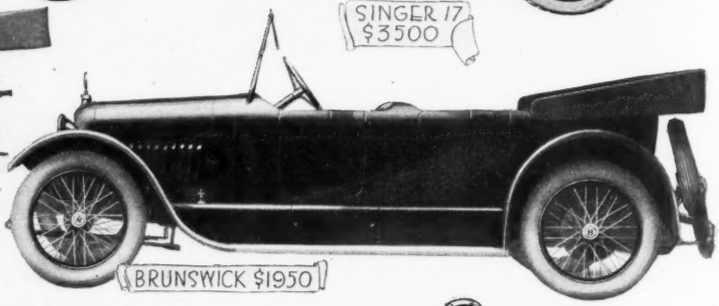
Seven-Passenger Touring Cars


CHANDLER 19 $1395

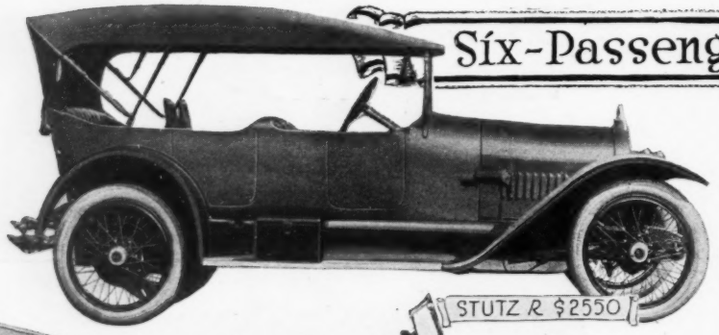

OLDSMOBILE 45 $1367

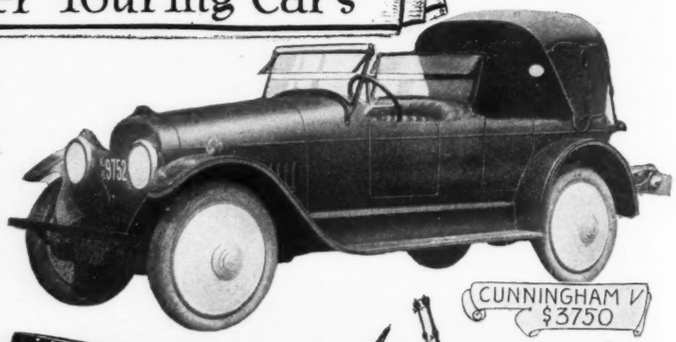

SINGER 17 $3500

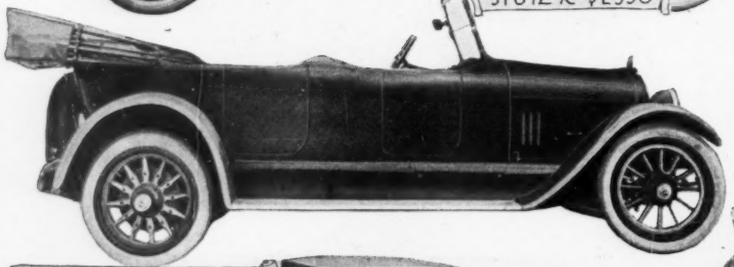

EMPIRE 70

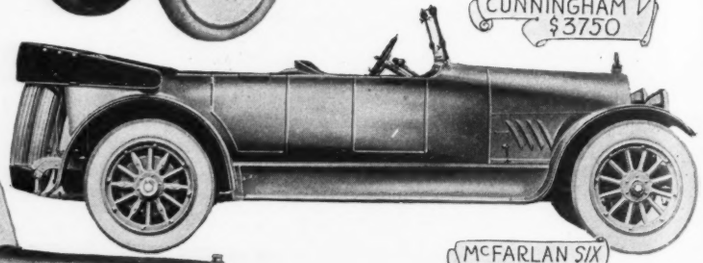

BRUNSWICK $1950

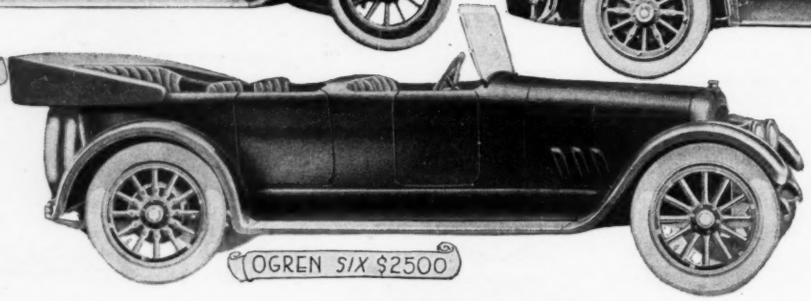
Six-Passenger Touring Cars


STUTZ R $2550


CUNNINGHAM V $3750


MERCER 22-73 $3500

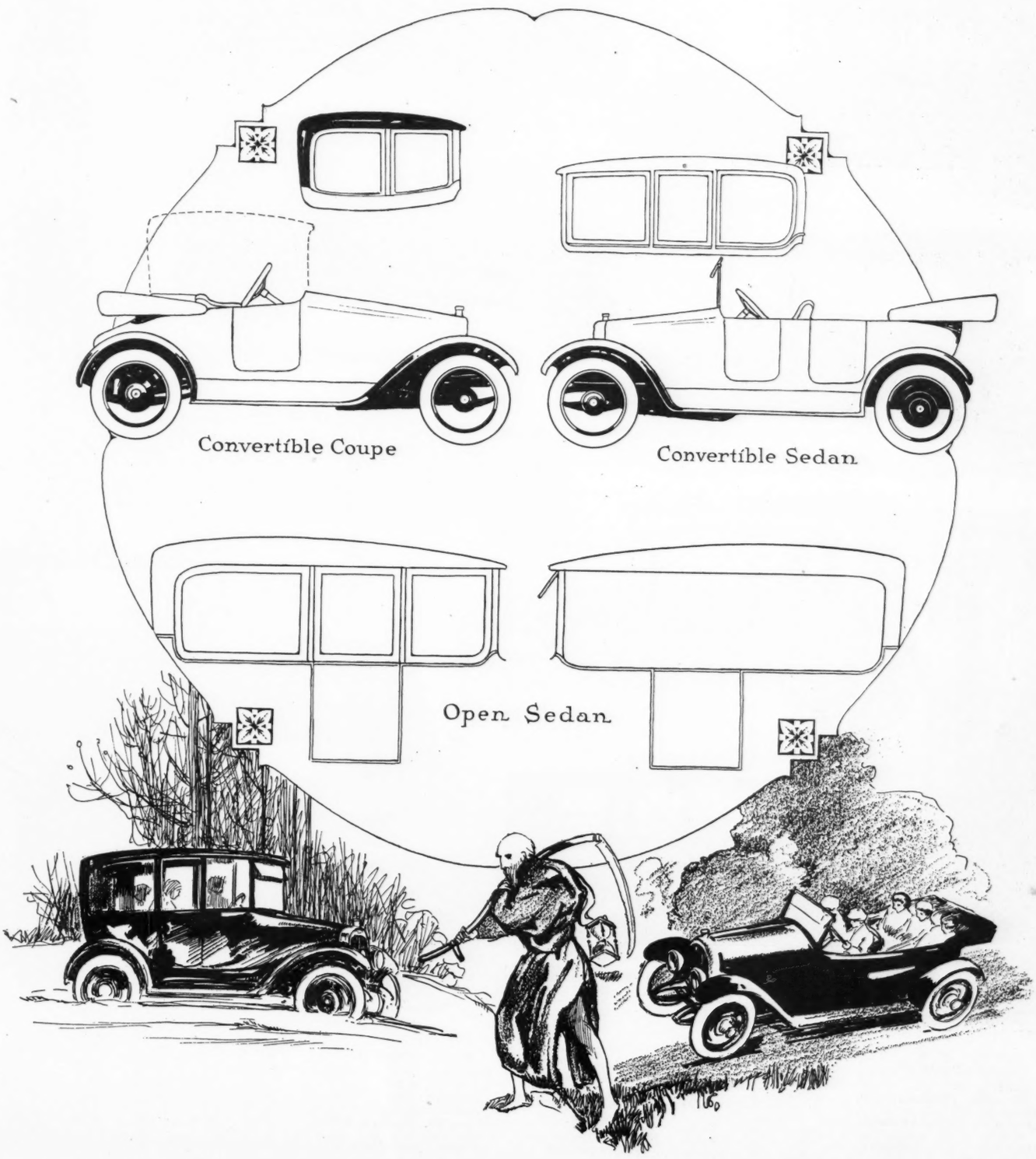

McFARLAN SIX $3500


OGREN SIX $2500

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Brunswick	$1950	4	36.10	120	32x4½
Chandler, 17	1395	6	27.34	123	34x4
Cunningham, V	3750	8	45.00	130	35x5
Empire, 70	...	6	25.35	120	34x4
McFarlan Six, 127	3500	6	48.60	136	35x5

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Mercer, 22-73	$3500	4	22.50	132	34x4½
Ogren Six	2500	6	33.75	132	34x4½
Oldsmobile, 45	1367	8	26.45	120	34x4
Singer, 17	3500	6	38.40	136	35x5
Stutz, R	2550	4	36.10	130	34x4½

The Winter-Summer Cars



Open

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Cadillac, 55	$2675	8	31.25	125	36x4½
*Cole, 863, Toursedan	2295	8	39.20	127	35x4½
King 8, EE	2150	8	28.80	120	34x4
Marmon, 34, Convertible Sedan	4100	6	33.75	136	35x5
Maxwell	985	4	21.03	103	30x3½
Moon, 6-66	2250	6	29.40	125	35x4½

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Oakland, 34	$1020	6	18.99	112	32x4
Overland, 85-6	1325	6	25.35	116	33x4½
Overland, 85-4	1195	4	27.23	112	33x4½
Peerless Eight, 56	2750	8	33.80	125	35x4½
Velie, 28, Touring Sedan	1685	6	25.35	115	32x4

* Later price than shown in illustration.

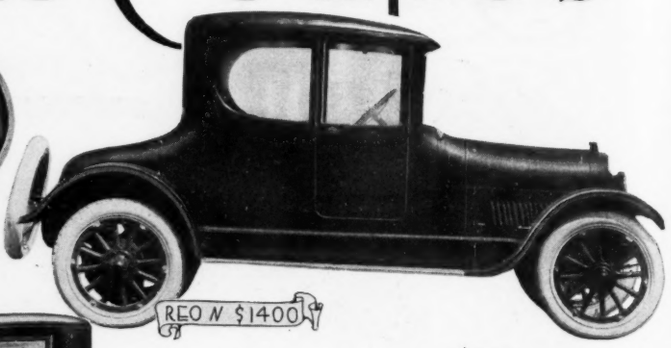
Sedans

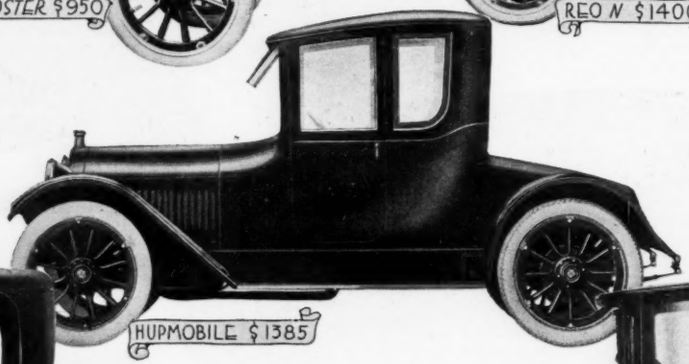
NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Allen Sedan	$1195	4	22.50	112	33x4
Chalmers, 6-30	1850	6	25.35	122	34x4
Grant Six, K, Enclosed Touring	1000	6	21.60	112	32x3½
Haynes Six, 37	2350	6	29.40	127	35x4½
*Mitchell, C-42	2085	6	29.40	127	34x4
Reo, M	1750	6	30.46	126	34x4½
Studebaker, 6-50, Tr'ng Sedan	1700	6	36.04	122	34x4

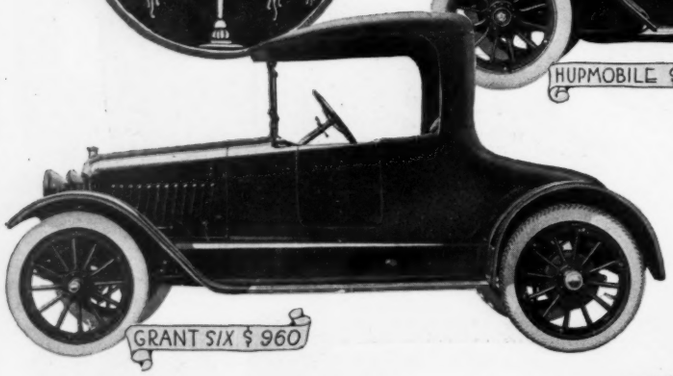
NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Sun, Lght Six, 17	$1295	6	23.44	116	34x4
Westcott, S-17, Tour Sedan	2190	6	29.40	125	35x4½
Westcott, S-17	2090	6	29.40	125	35x4½
Winton Six, 33	3300	6	33.75	128	36x4½
Winton Six, 48	3300	6	48.60	138	37x5

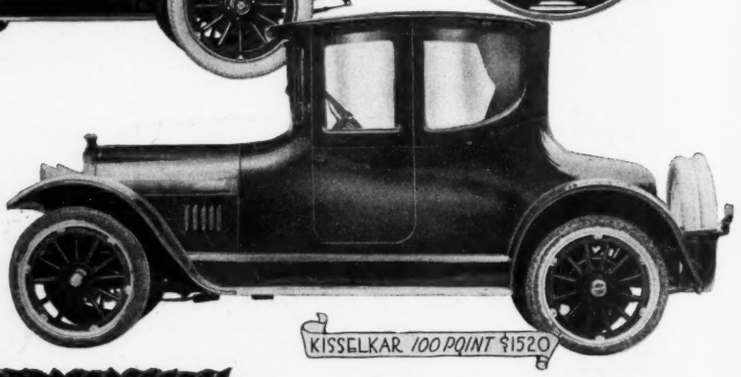
*Later price than shown in illustration.

Convertible Coupes

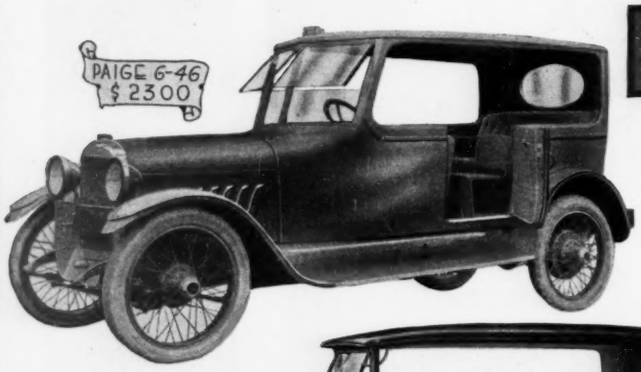


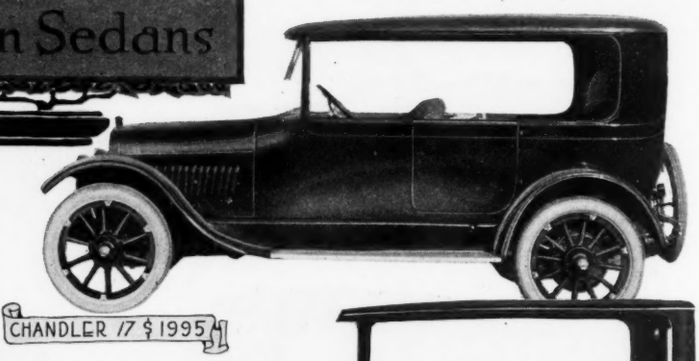


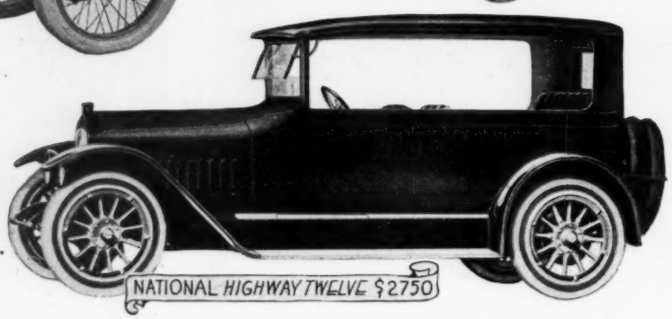


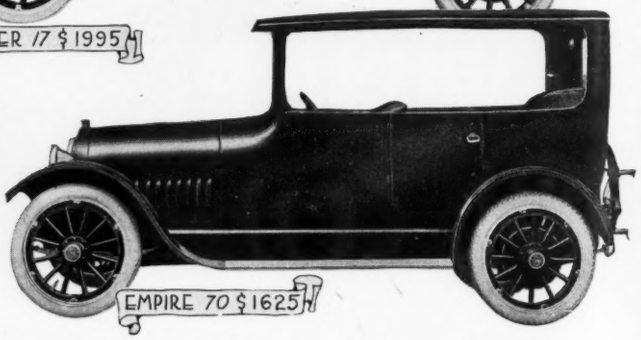


Open Sedans





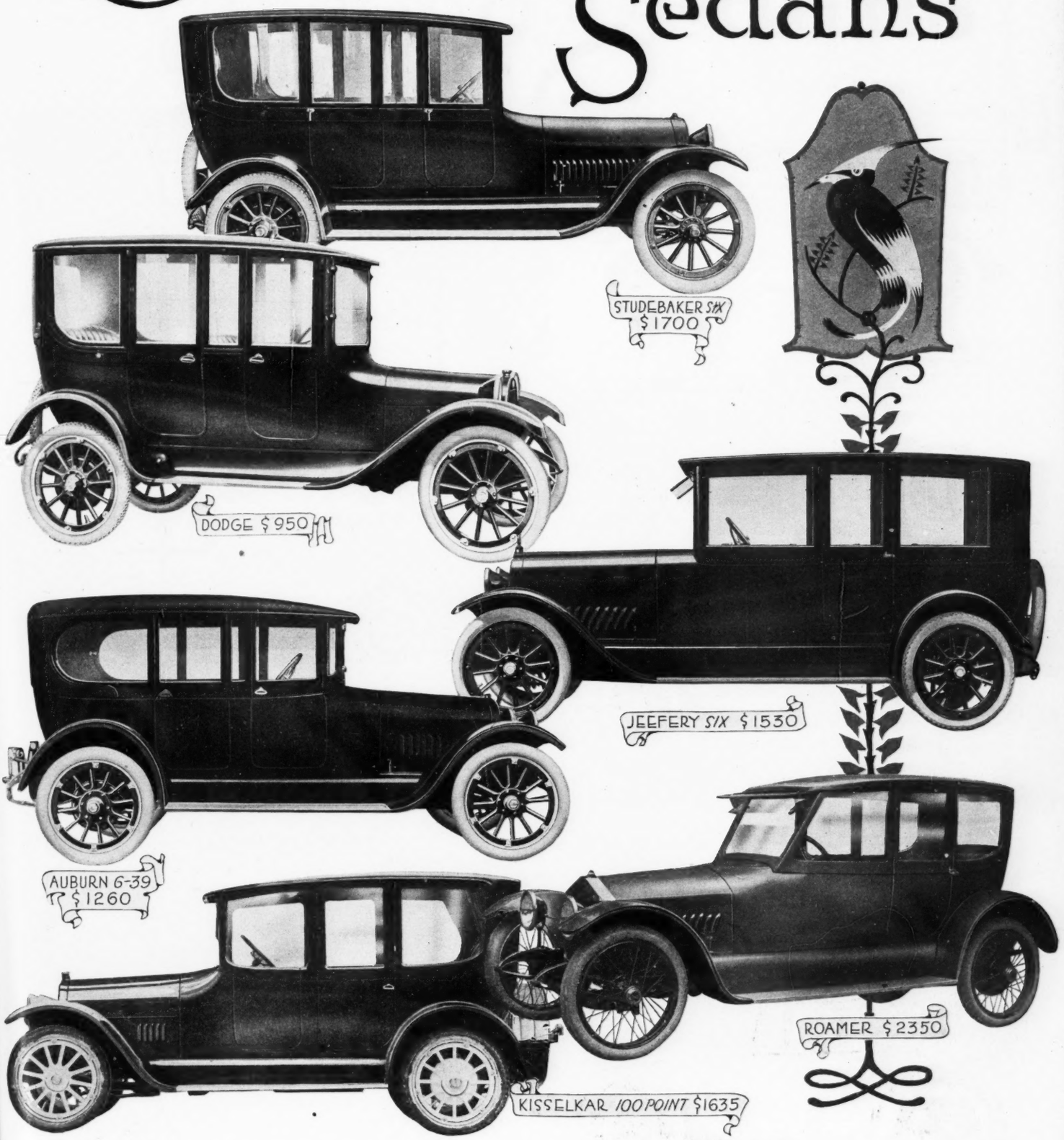




NAME AND MODEL	PRICE	CYL.	H. P.	W. P.	TIRES
Dodge, Winter Roadster	$ 950	4	24.03	114	32x3½
Grant Six, Roadster Sedan	960	6	21.60	112	32x3½
Hupmobile, Year 'Round Roadster	1385	4	22.50	119	34x4
KisselKar, 100 Point, All Year Coupe	1520	6	25.35	117	32x4
Reo, M, Convertible Coupe	1400	6	30.46	126	34x4½

NAME AND MODEL	PRICE	CYL.	H. P.	W. P.	TIRES
Chandler, 17, Convertible Coupe	$1995	6	27.34	123	34x4
Empire, 70, Sedan	1625	6	25.35	120	34x4
National Twelve, Touring Sedan	2750	12	39.68	128	34x4½
National Six, Touring Sedan	2350	6	29.40	128	34x4½
Paige, 6-46	2300	6	29.40	124	35x4½

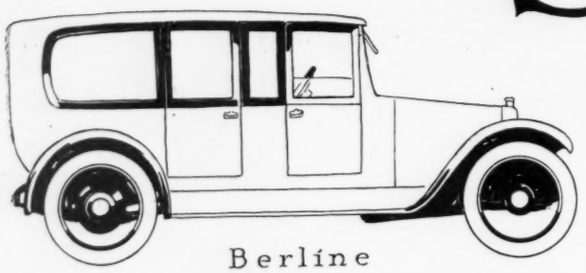
Convertible Sedans



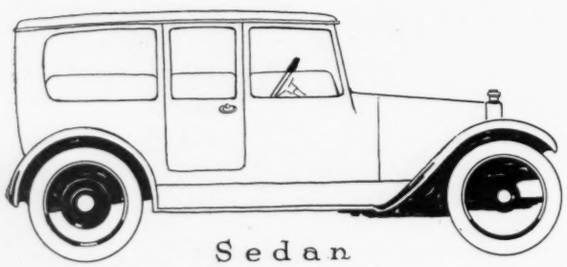
NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Auburn, 6-39	$1260	6	23.44	120	34x4
Auburn, 6-44	1735	6	29.40	131	35x4½
Dodge, Winter Touring	950	4	24.03	114	32x3½
Jeffery Six	1530	6	29.40	125	34x4

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Kissel, All-Year	$1635	6	25.35	117	32x4
Kissel, All-Year	1520	6	25.35	117	32x4
Roamer, Sedan	2350	6	23.44	124	34x4
Studebaker 6	1700	6	36.04	122	34x4

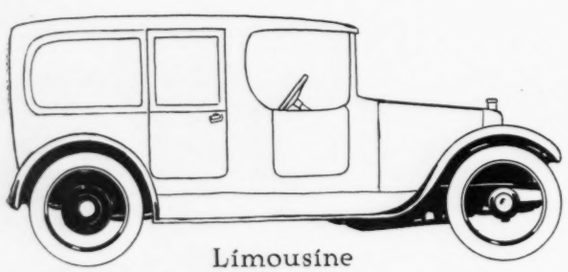
Closed Car Styles



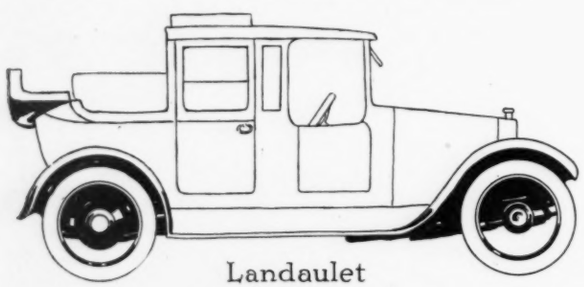
Berline



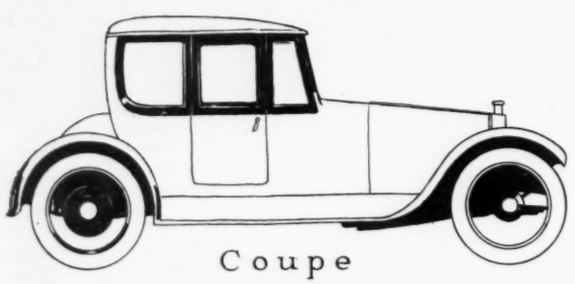
Sedan



Limousine



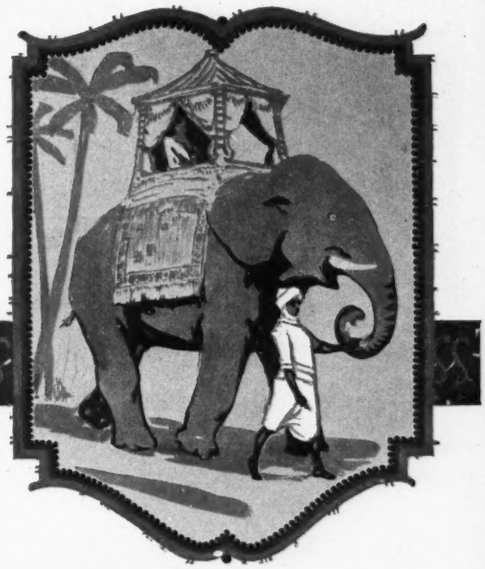
Landaulet

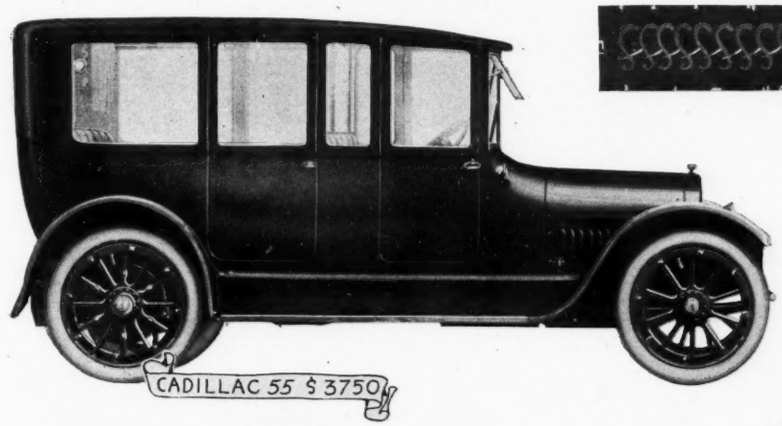


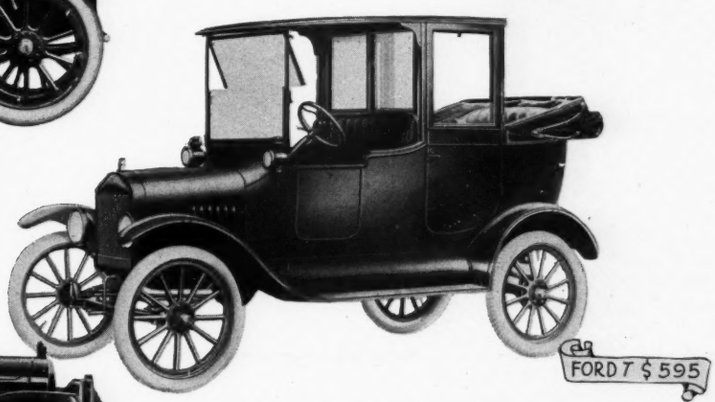
Coupe

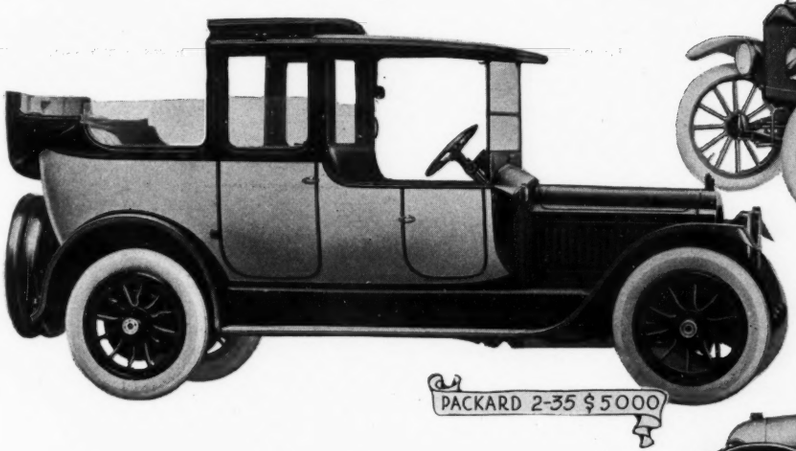
Brougham

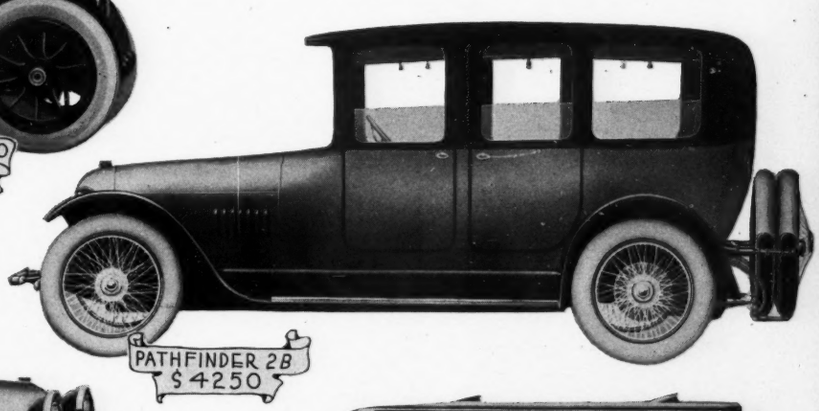
Berlines and Landaulets

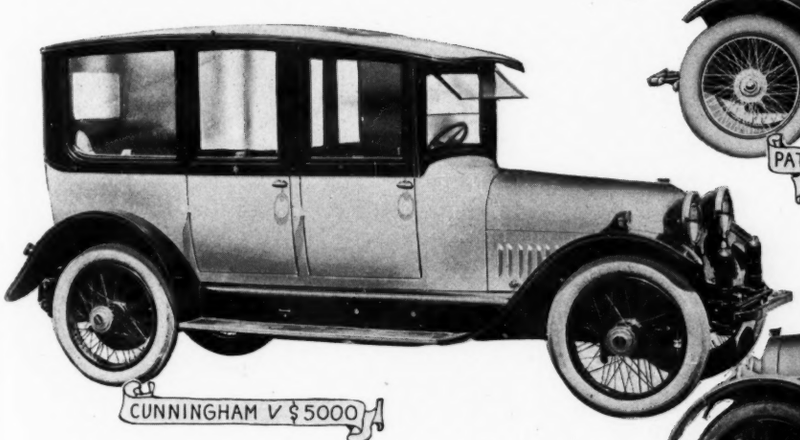


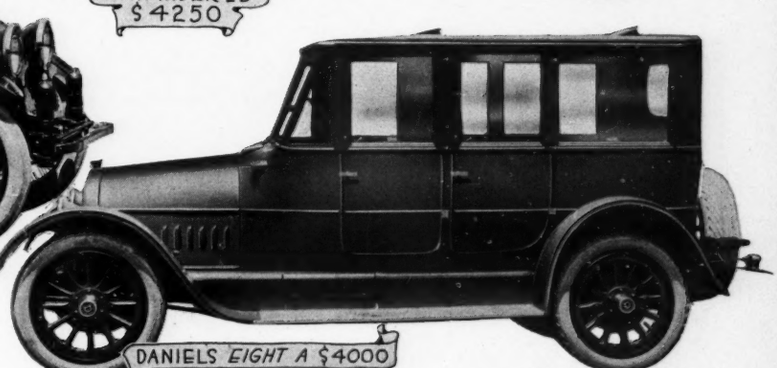








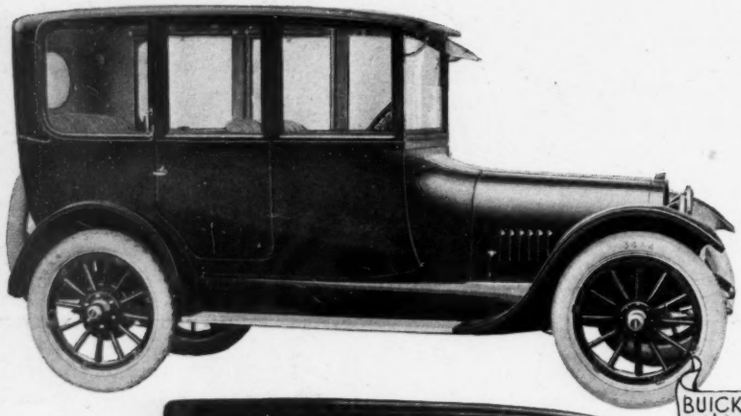




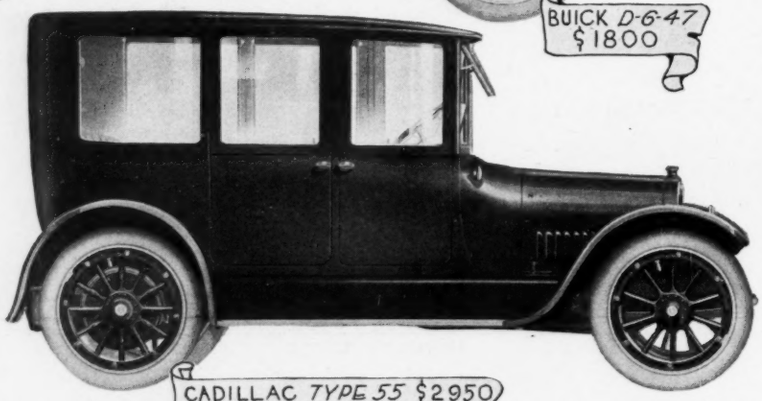
NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Cadillac, 55, Imperial	$3750	8	31.25	132	36x4½
Cadillac, 55	3750	8	31.25	132	36x4½
Cunningham, V, Landaulet	5250	8	45.00	130	35x5
Daniels Eight, A, Berlin Suburban	4000	8	33.80	127	34x4½
Ford, T, Town Car	595	4	22.50	100	30x3½

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Packard, 2x35, Landaulet	$5000	12	43.20	135	35x5
Packard, 2-35, Landaulet	5050	12	43.20	135	35x5
Packard, 2-35, Landaulet	4950	12	43.20	135	35x5
Packard, 2-25, Landaulet	4500	12	43.20	126	35x5
Pathfinder, 2B, Berlin Limousine	4250	12	39.68	130	35x5

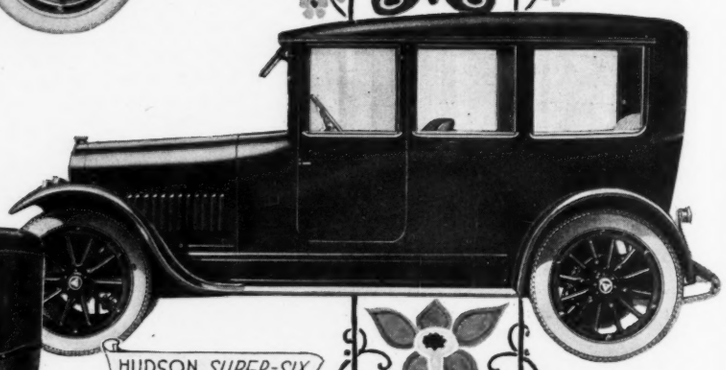
Sedans



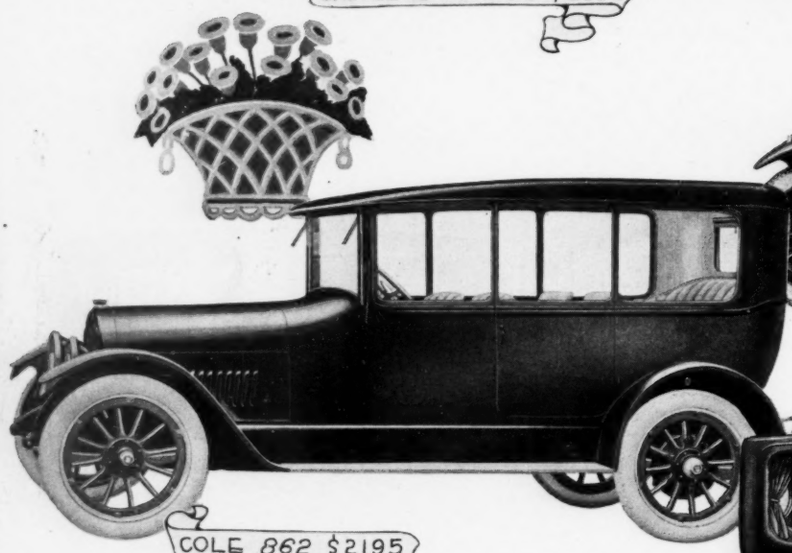
BUICK D-6-47 $1800



CADILLAC TYPE 55 $2950

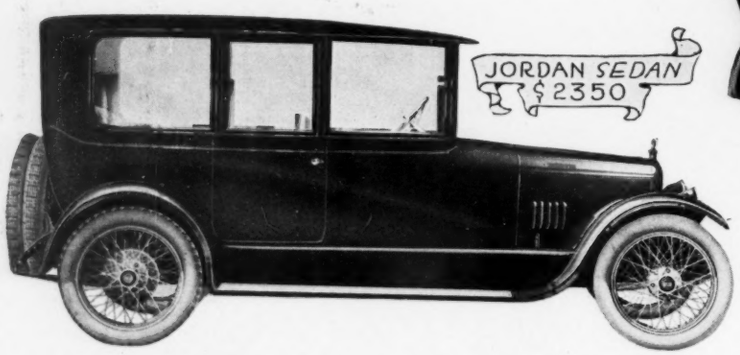


HUDSON SUPER-SIX $2175



COLE 862 $2195

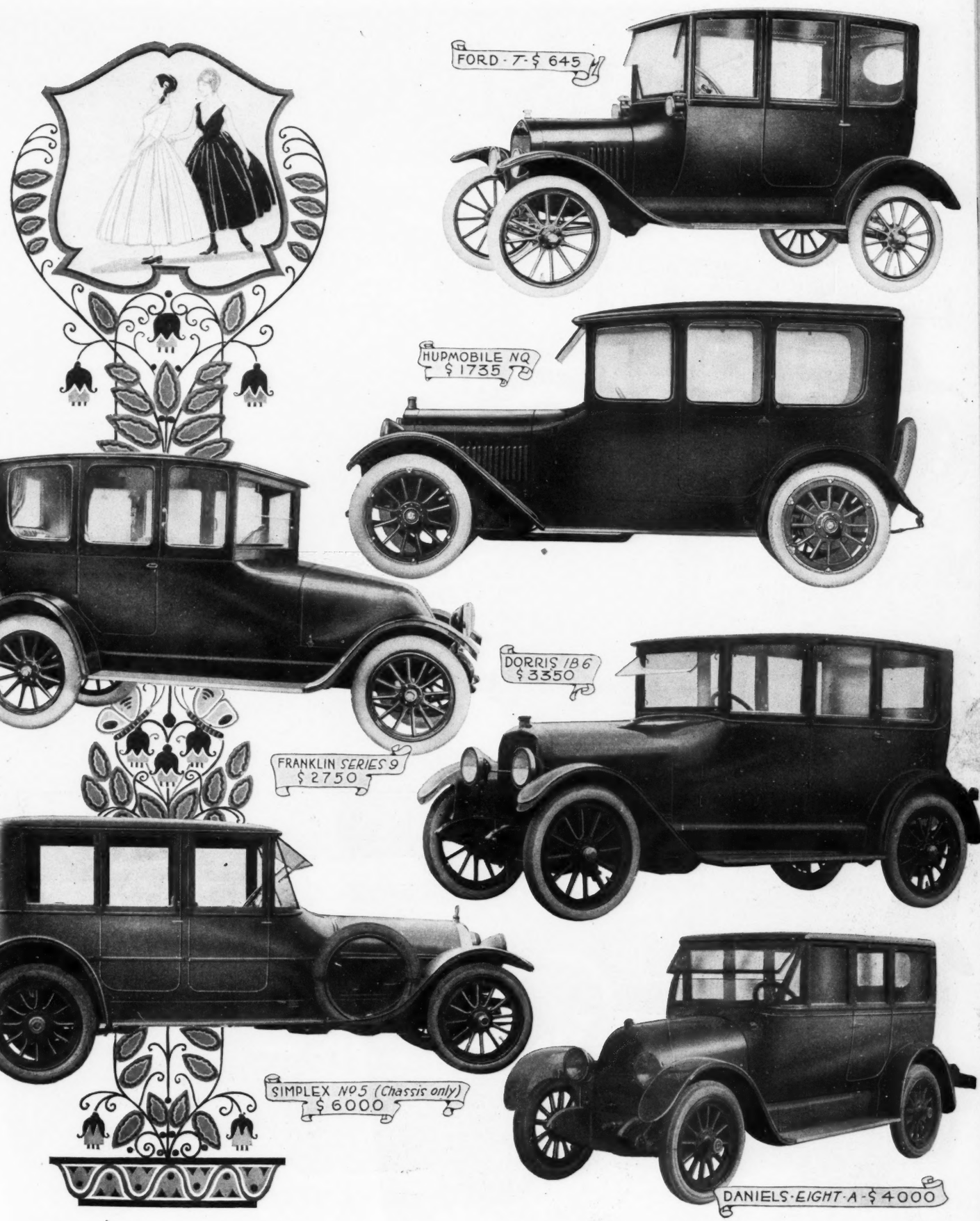
WINTON SIX 33 $3900



JORDAN SEDAN $2350

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
*Buick, D-6-47	$1835	6	25.35	115	34x4
Cadillac, 55, Brougham	2950	8	31.25	125	36x4½
Cole, 862	2295	8	39.20	127	35x4½
Hudson Super-Six, Touring Sedan	2175	6	29.40	125½	35x4½
Jordan, Sedan	$2350	6	29.40	127	35x4½
Winton Six, 33	3900	6	33.75	128	36x4½
Winton Six, 48	4750	6	48.60	138	37x5

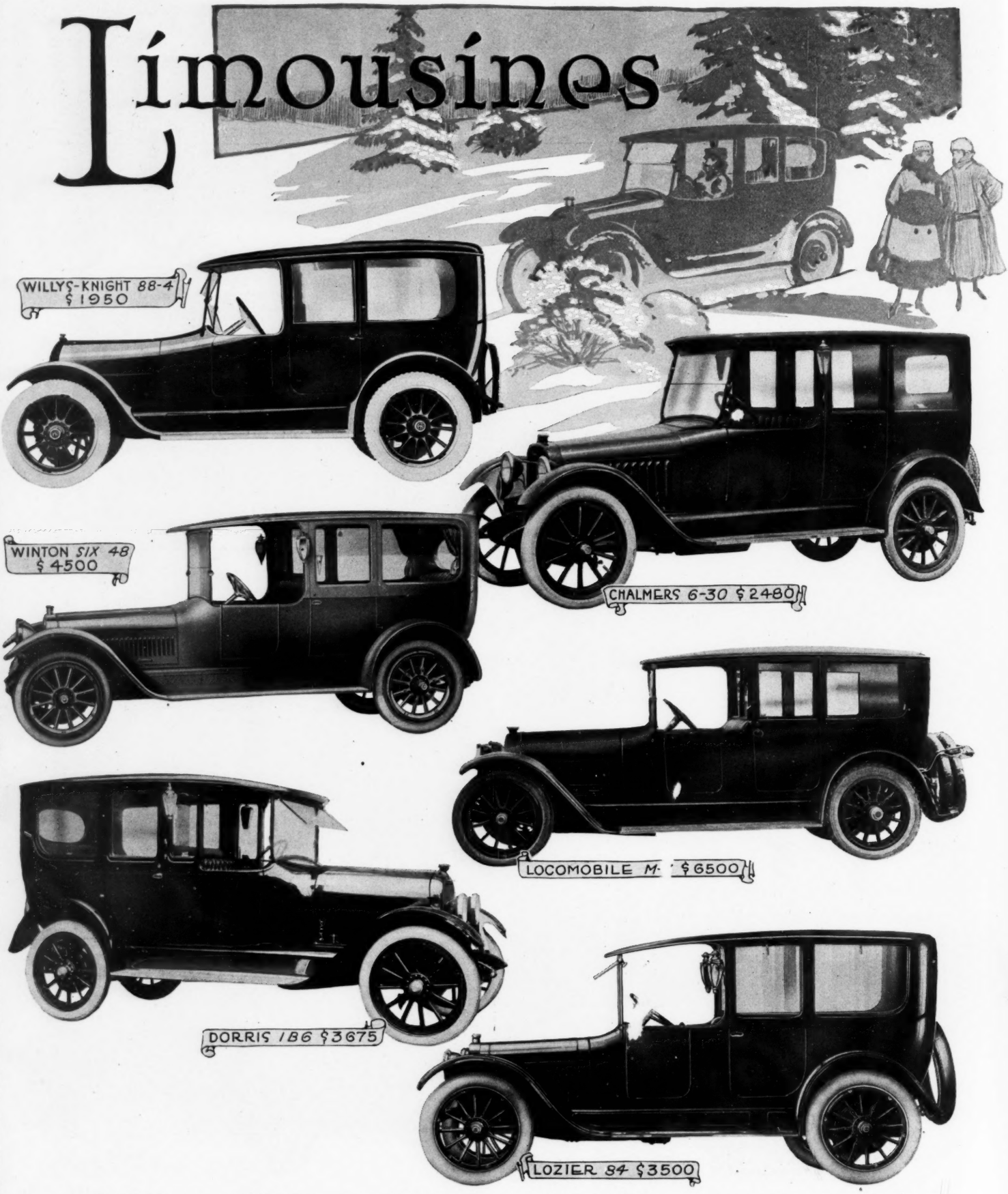
* Later price than shown in illustration.



NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Daniels, Eight, A	$4000	8	33.80	127	34x4½
Dorris, 1B6	3350	6	38.40	128	36x4½
Ford, T	645	4	22.50	100	30x3½
Franklin, Series 9	2750	6	25.35	115	32x4

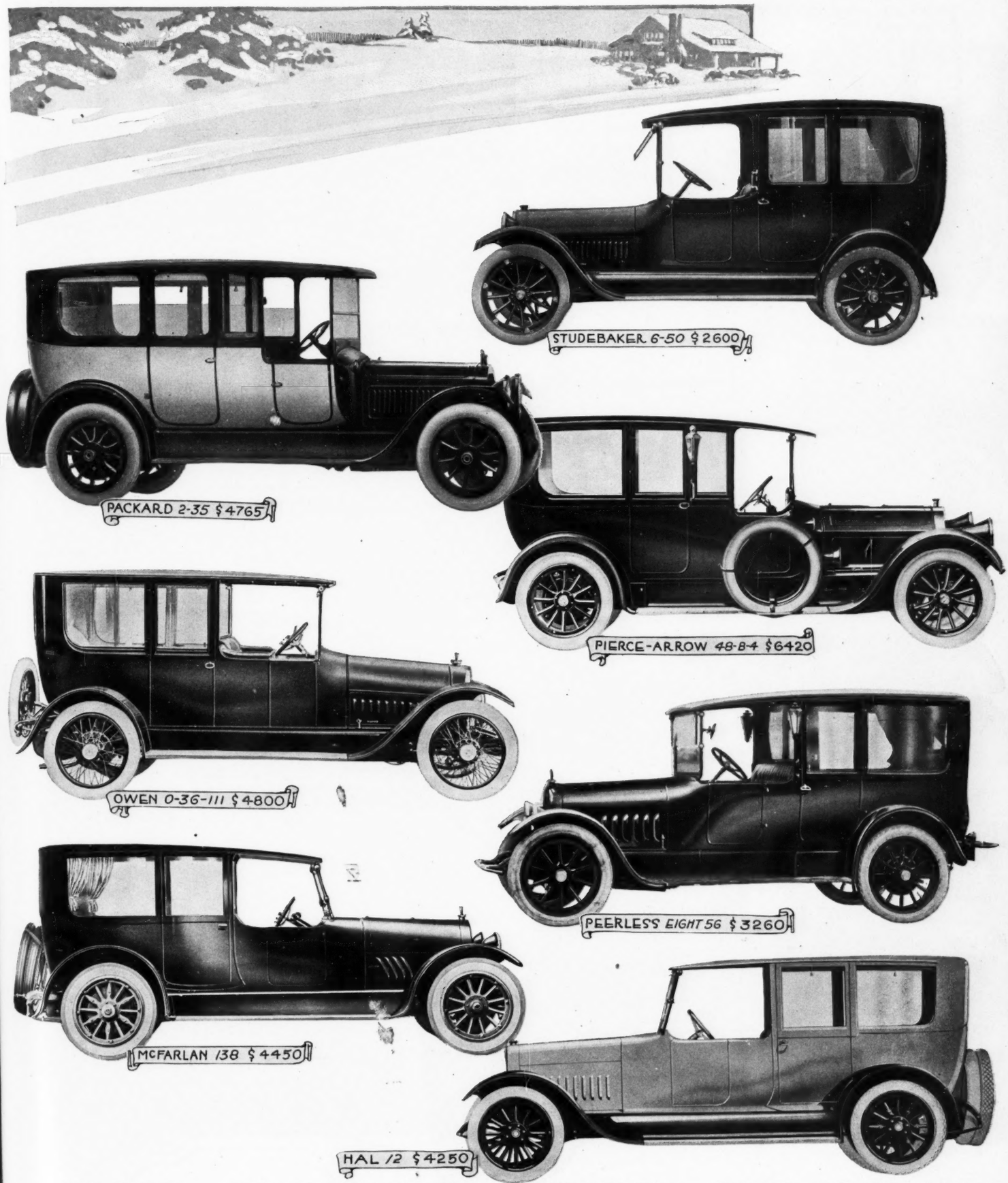
NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Hupmobile, NQ	$1735	4	22.50	119	35x4½
Reo	1750	6	30.46	126	34x4½
Simplex, No. 5 (Chassis only)	6000	6	45.94	143½	37x5

Limousines



NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
*Chalmers, 6-30	$2550	6	25.35	122	34x4
Dorris, 1B6	3675	6	38.40	128	36x4½
Locomobile, M-7	6500	6	48.60	142	37x5
Locomobile, R-7	5600	6	43.35	139	37x5
Lozier, 84, Sedan Limousine	3500	..	....	...	....
Willys-Knight, 88-4	$1950	4	27.23	121	34x4½
Winton Six, 48	4500	6	43.35	138	37x5
Winton Six, 33	3650	6	33.75	128	36x4½

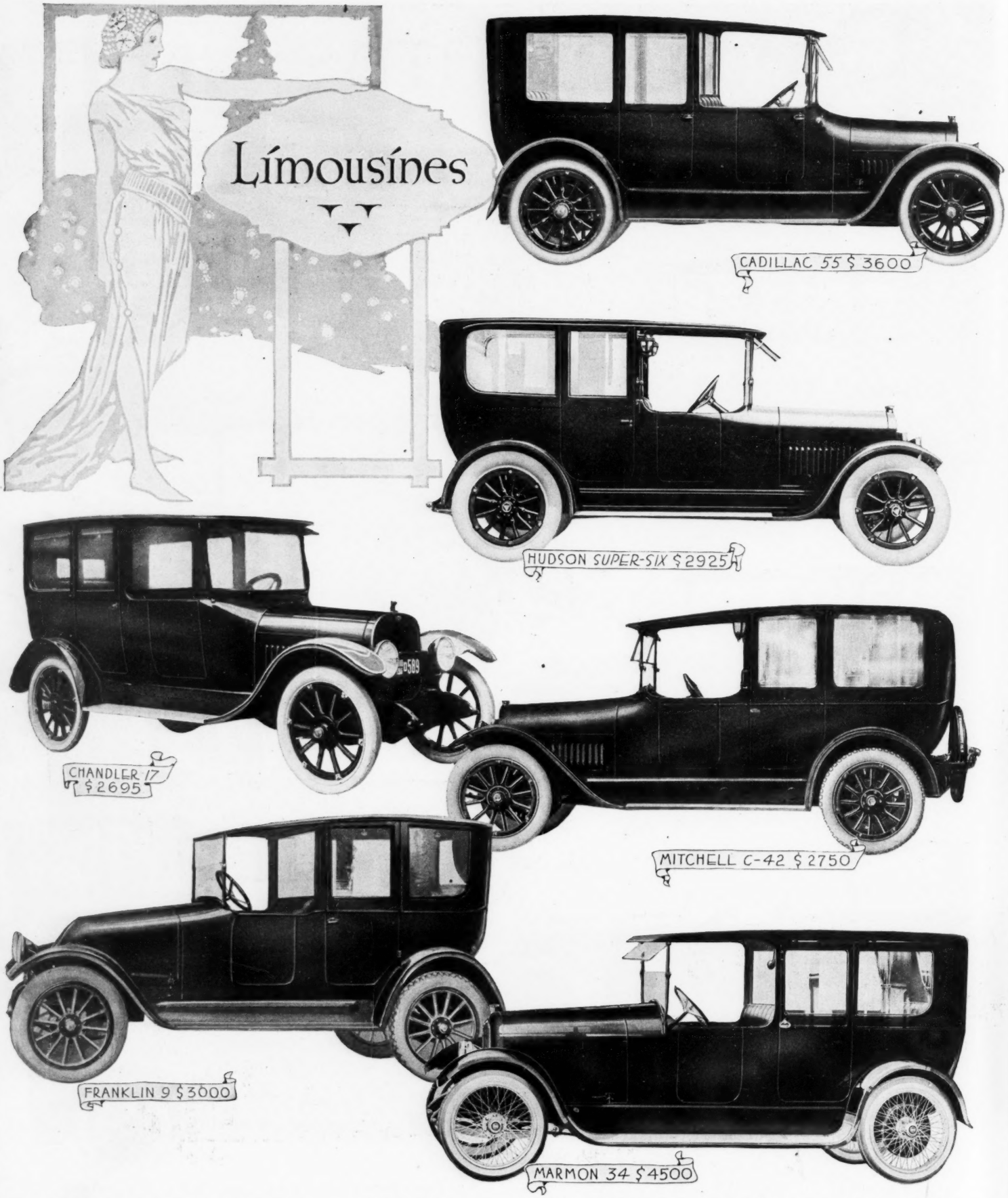
*Later price than shown in illustration.



NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
HAL 12	$4250	12	39.68	135	34x4½
*McFarlan, 138	4750	6	48.60	136	35x5
Owen Magnetic, O-36	4800	6	33.75	136	35x5
Owen Magnetic, M-25	4200	6	29.40	125	34x4½
Peerless Eight	3260	8	33.80	125	35x4½
Pierce-Arrow, 48-B-4, Suburban	6420	6	48.60	142	37x5
Pierce-Arrow, 66, Suburban	7420	6	60.00	147½	38x5½

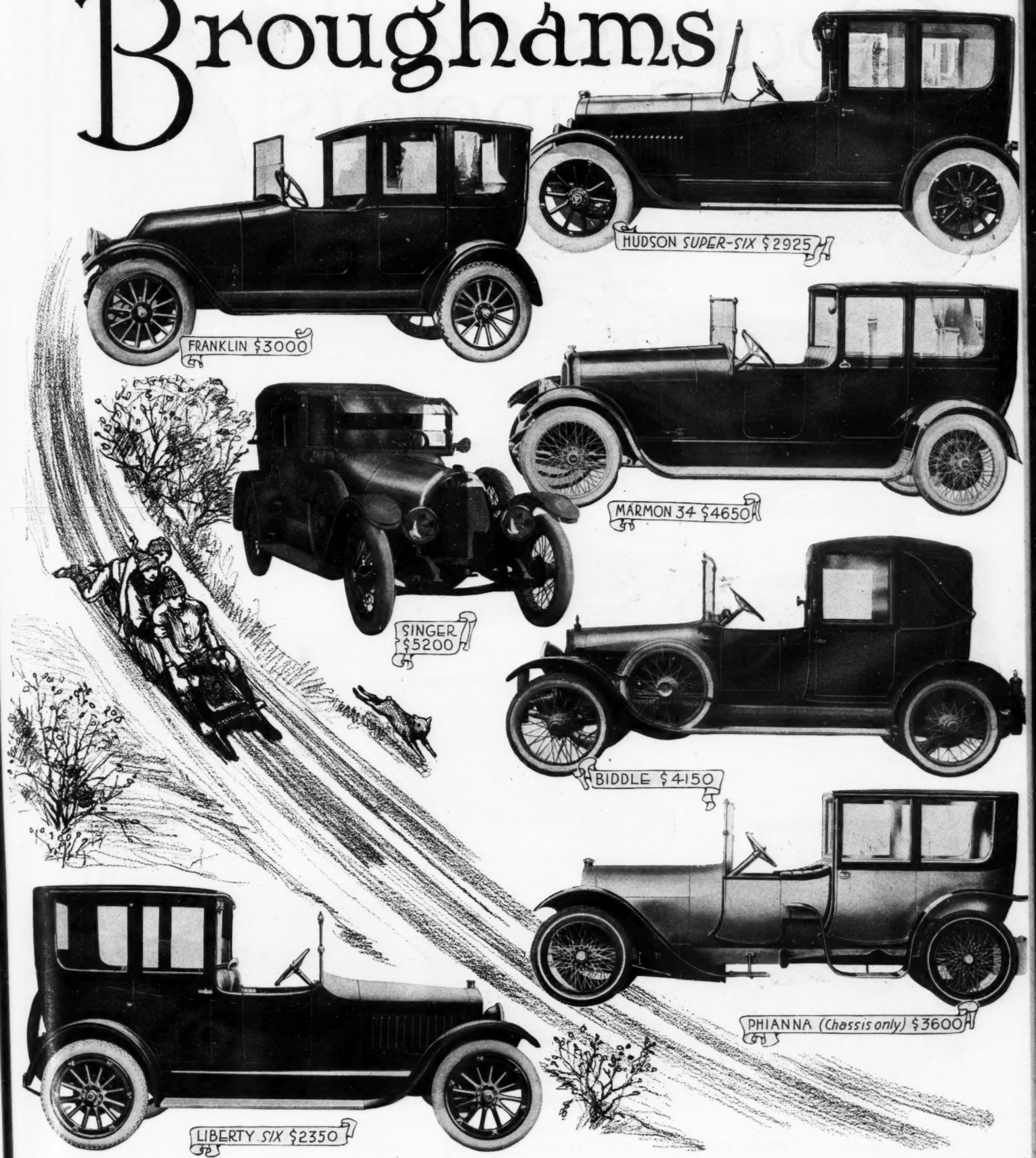
NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
*Packard, 2-35	$5000	12	43.20	135	35x5
Packard, 2-35	4950	12	43.20	135	35x5
Packard, Imperial	5150	12	43.20	135	35x5
Packard, 2-35	4900	12	43.20	135	35x5
Packard, 2-25	4450	12	43.20	126	35x5
Studebaker, 6-50	2600	6	36.04	122	34x4

*Later price than shown in illustration.



NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Cadillac, 55	$3600	8	31.25	132	36x4½
Chandler, 17	2695	6	27.34	123	34x4
Franklin, 9	3000	6	25.35	115	32x4
Hudson Super-Six	$2925	6	29.40	125½	35x4½
Marmon, 34	4500	6	33.75	136	35x5
Mitchell, C-42	2750	6	29.40	127	34x4

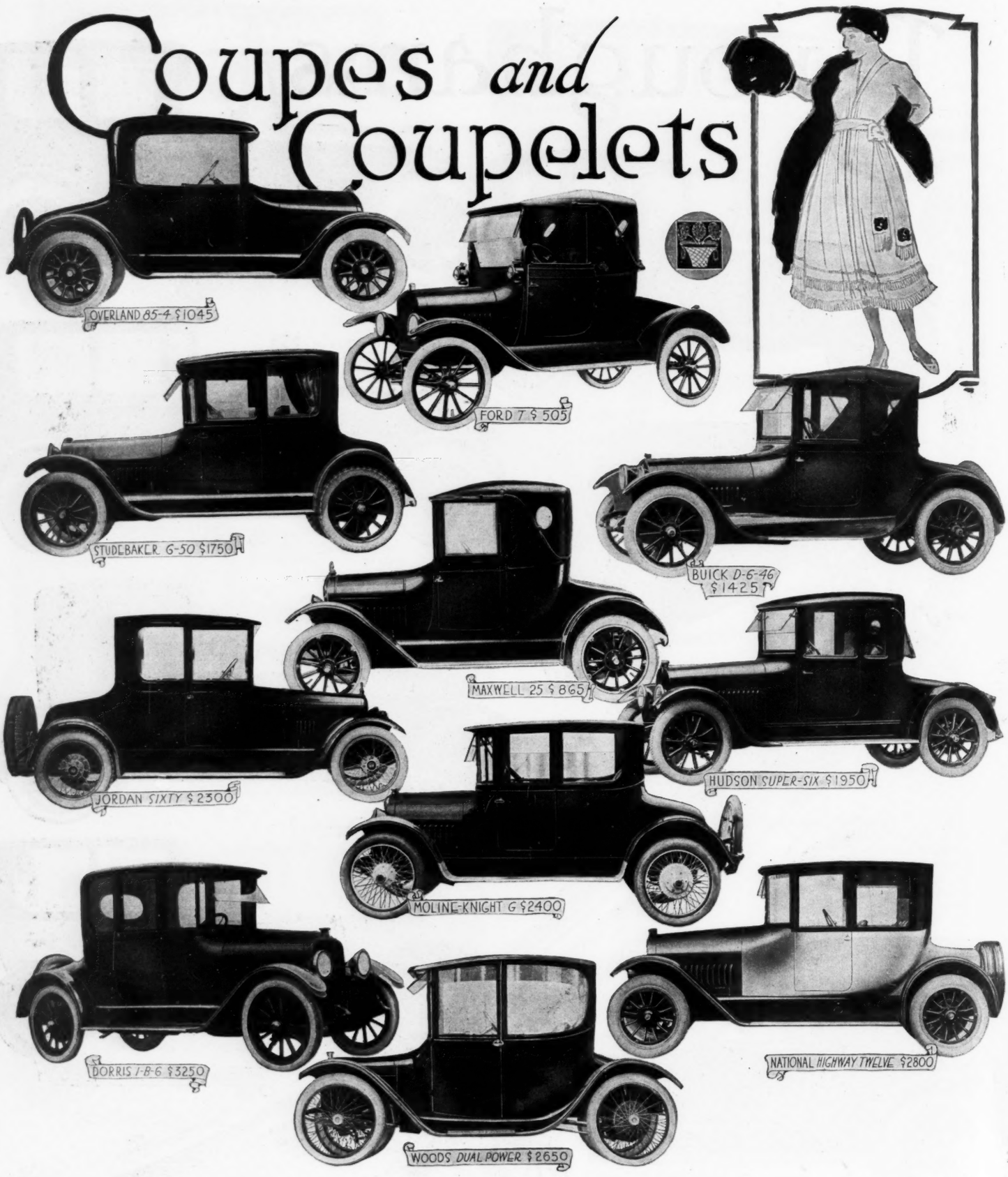
Broughams



NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Biddle	$4150	4	22.50	122	32x4
Franklin, Town Car	3000	6	25.35	115	32x4
Hudson, Super-Six, Town Car	2925	6	29.40	125½	35x4½
Liberty Six, Brougham	2350	6	23.44	115	32x4

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Marmon, 34, Town Car	$4650	6	33.75	136	35x5
Phianna (Chassis only)	3600	4	24.70	125	32x4½
Singer	5200	6	38.40	136	35x5

Coupes and Coupelets



NAME AND MODEL	PRICE	CYL.	H. P.	W. P.	TIRES
*Buick, D-6-46 Cabriolet	$1440	6	25.35	115	34x4
Dorris, I-B-6, Coupe	3250	6	38.40	128	36x4½
Ford, T, Coupelet	505	4	22.50	100	30x3½
Hudson Super-Six, Cabriolet	1950	6	29.40	125½	35x4½
Jordan Sixty, Coupe	2300	6	29.40	127	35x4½
Maxwell, 25, Cabriolet	865	4	21.03	103	30x3½
Moline-Knight, G, Coupe	2400	4	25.60	122	35x4½

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
National Twelve, Coupe	$2800	12	39.68	128	34x4½
National Six, Coupe	2400	6	29.40	128	34x4½
Overland, 85-4, Coupe	1045	4	27.23	112	32x4
Overland, 85-6, Coupe	1175	6	25.35	116	32x4
Studebaker, 6-50, Coupe	1750	6	36.04	122	34x4
Woods Dual Power, Coupe	2650	4	10.00	110	34x4

* Later price than shown in illustration.

Miscellaneous Types

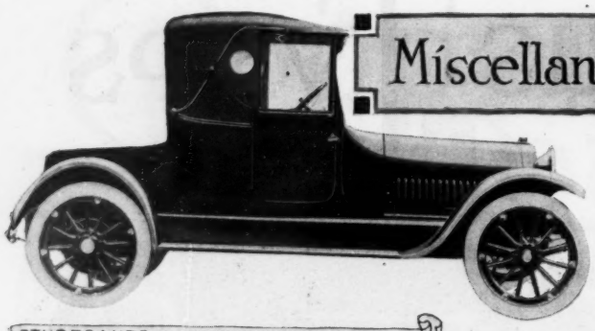
OVERLAND COUNTRY CLUB $695
BUICK D-4-34 2 PASS. $650
STUDEBAKER CONVERTIBLE SEDAN $1380
BRISCOE COACHAIRE $810
ROSS EIGHT C 3 PASS. ROADSTER $1550
BREWSTER COUNTRY BROUGHAM $7500
HARVARD 2 PASS. ROADSTER $750
BEN-HUR TOURING SEDAN $2750

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Ben-Hur, Touring Sedan	$2750	6	29.40	126	35x4½
Brewster, Country Brougham	7500	4	25.60	125	34x4½
Briscoe Coachaire	810	4	33.16	105	30x3½
*Buick, D-4-34, 2-Passenger	660	4	18.23	106	31x4
Harvard, 2-Passenger	750	4	14.40	100	28x3

NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Overland, Country Club	$ 695	4	18.23	104	31x4
Studebaker, Convertible Sedan	1380	6	36.04	122	34x4
Studebaker, Convertible Sedan	1140	4	24.03	112	34x4
Ross Eight, C, 3-Passenger	1550	8	33.80	130	35x4½

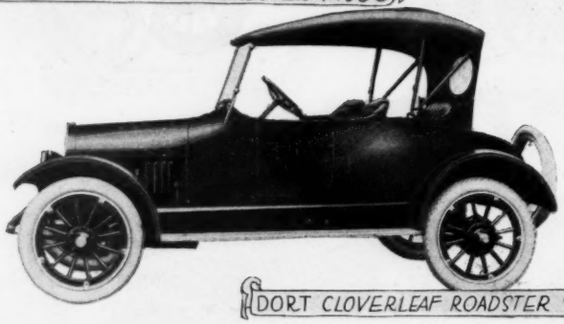
* Later price than shown in illustration.

Miscellaneous Body Types

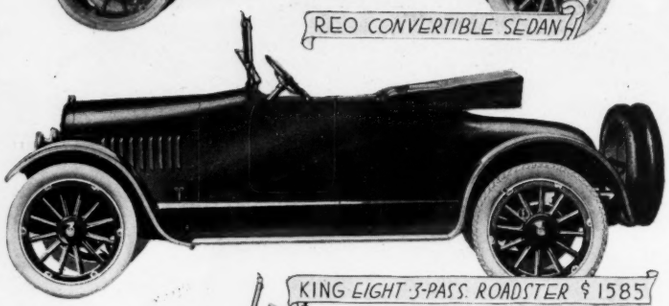


STUDEBAKER LANDAU ROADSTER $1350

REO CONVERTIBLE SEDAN

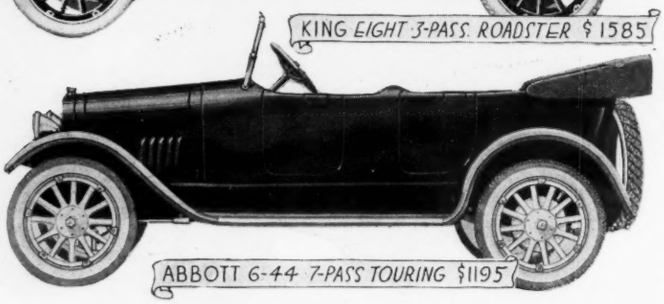


DORT CLOVERLEAF ROADSTER $695



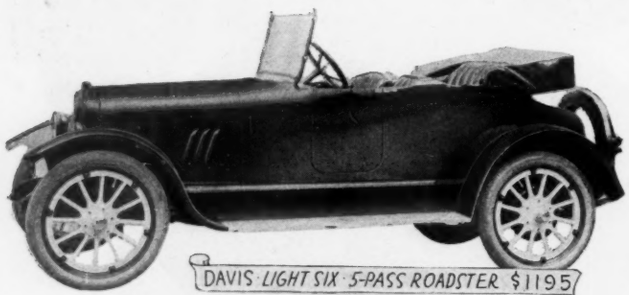
KING EIGHT 3-PASS. ROADSTER $1585

WHITE 16 VALVE 4 7-PASS $4600

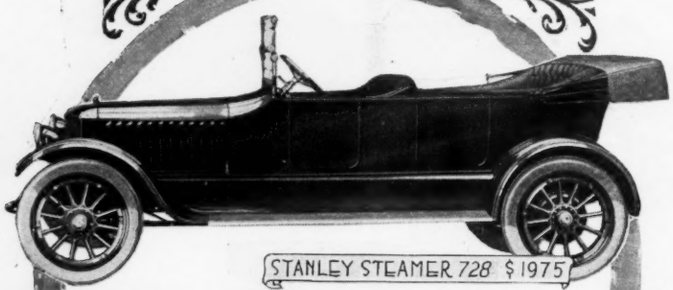


ABBOTT 6-44 7-PASS TOURING $1195

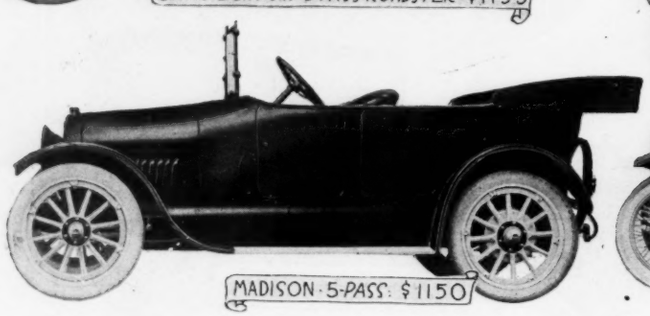
The Two Steamers



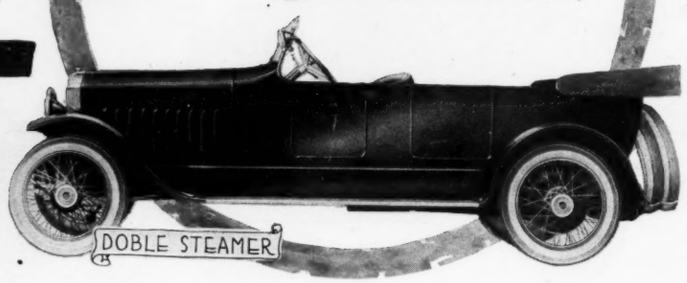
DAVIS LIGHT SIX 5-PASS ROADSTER $1195



STANLEY STEAMER 728 $1975



MADISON 5-PASS. $1150



DOBLE STEAMER

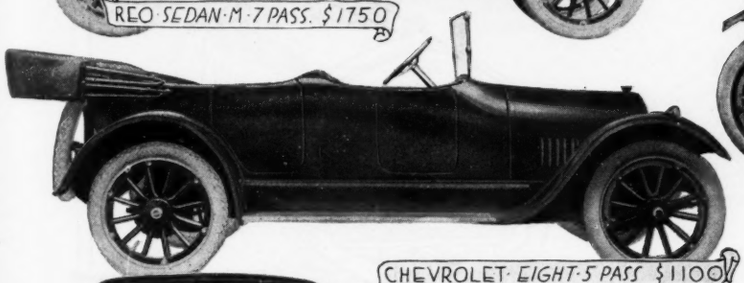
NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Abbott, 6-44, 7-pass. touring	$1195	6	25.35	122	32x4
Davis Light Six, 5-pass. roadster	1195	6	25.35	118	34x4
Dort, Cloverleaf roadster	695	4	16.90	105	30x3½
King Eight, 3-pass. roadster	1585	8	28.80	120	34x4
Madison, 5-pass.	1150	6	23.44	115	34x4
Reo, Convertible sedan	...	6	30.46	126	34x4½

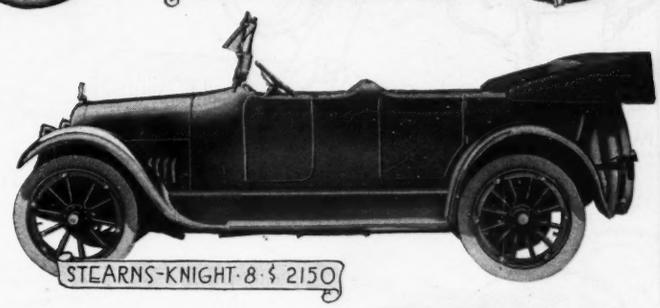
NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
Studebaker, Landau roadster	1350	6	36.04	122	34x4
White, 16 valve 4, 7-pass.	4600	4	28.90	137½	37x5
THE TWO STEAMERS					
Doble Steamer, 7-pass.	...	..	....	...	....
Stanley Steamer, 728, 5-pass.	2200	..	....	...	....

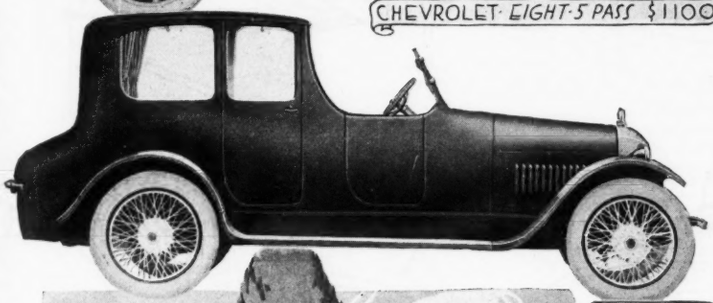
Miscellaneous Body Types

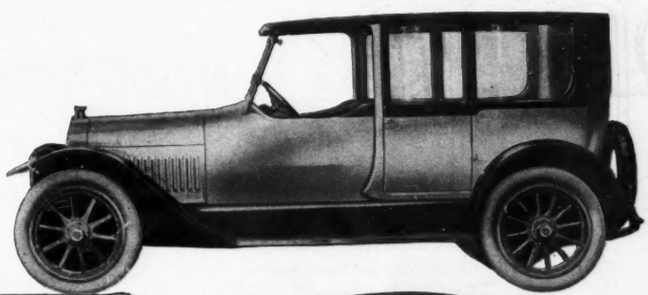
REO SEDAN-M-7 PASS. $1750

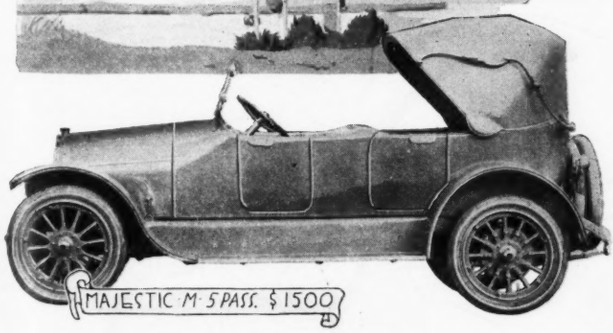
OLDSMOBILE-45-CLUB ROADSTER-$1295

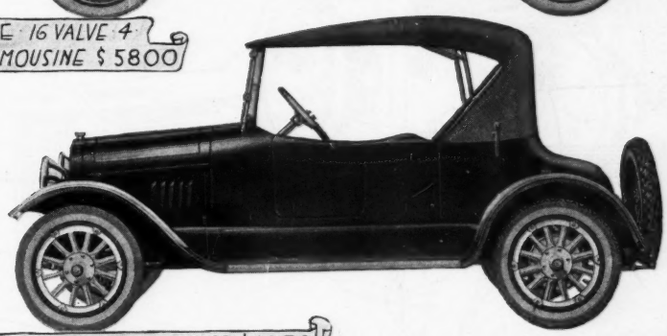

CHEVROLET-EIGHT-5 PASS $1100

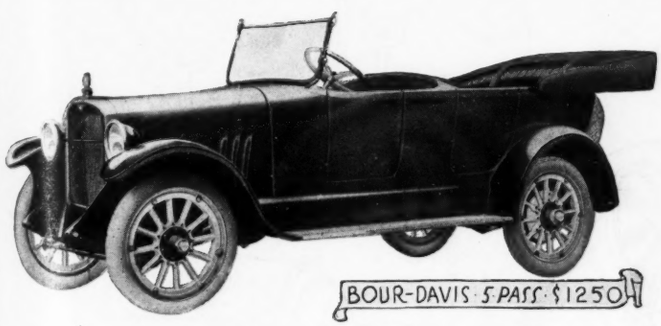

STEARNS-KNIGHT-8-$ 2150

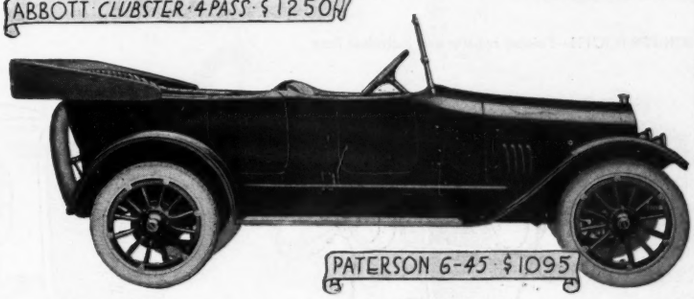

PATHFINDER TOWN CAR-7 PASS.


WHITE-16 VALVE-4 LIMOUSINE $ 5800


MAJESTIC-M-5 PASS. $1500


ABBOTT-CLUBSTER-4 PASS-$1250


BOUR-DAVIS-5 PASS-$1250


PATERSON 6-45 $1095

	NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
5	Abbott, Clubster, 4-pass.	$1250	6	25.35	122	32x4
8	Bour-Davis, 5-pass.	1250	6	25.35	118	32x4
*85	Chevrolet Eight, 5-pass.	1285	8	36.45	120	34x4
2	Majestic, M, 5-pass.	1500	8	28.80	125	32x4
10	445 Oldsmobile, 45, Club roadster	1295	8	26.45	120	33x4
11	Paterson, 6-45	1095	6	25.35	117	32x4

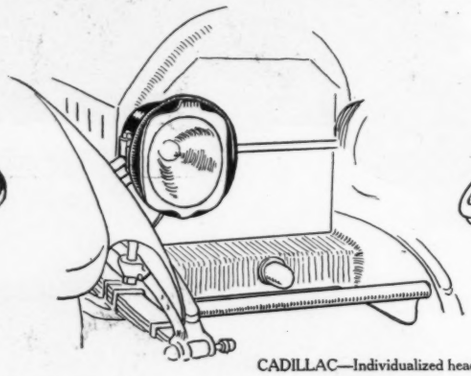
	NAME AND MODEL	PRICE	CYL.	H. P.	W. B.	TIRES
864	Pathfinder Town Car, 7-pass.		12	39.68	135	35x5
517	Reo Sedan, M, 7-pass.	$1750	6	30.46	126	34x4½
4	Stearns-Knight 8	2150	8	33.80	123	35x4½
7	White, 16 valve 4, limousine	5800	4	28.90	137½	37x5

* Later price than shown in the illustration.

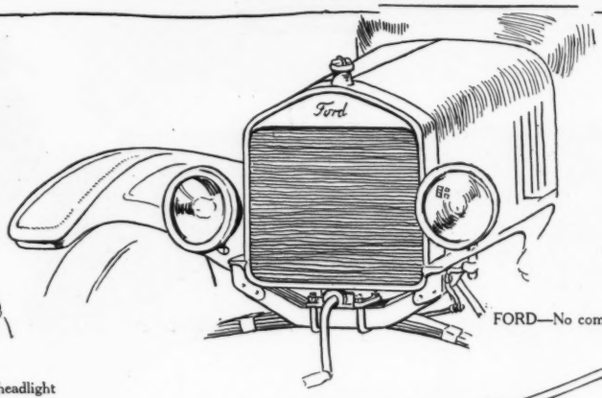
Car Personalities

Individualities by which 1917 Cars Can be Readily Recognized

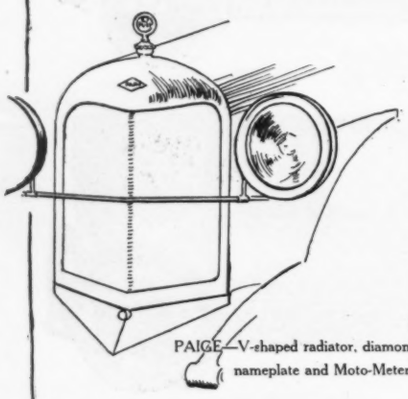
PACKARD—Has twin sixes on the radiator cap



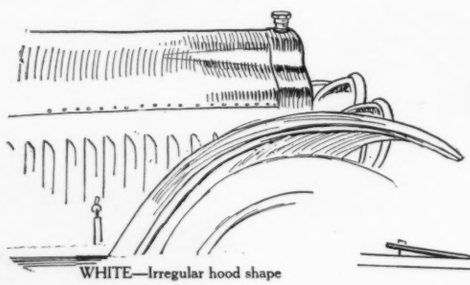
CADILLAC—Individualized headlight



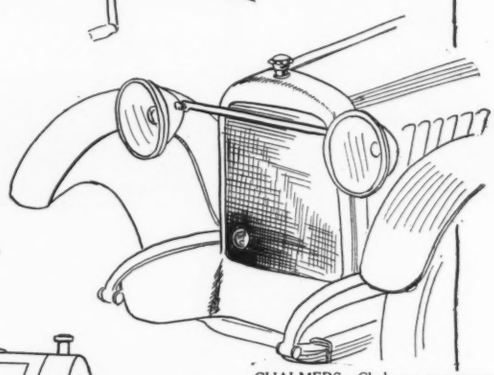
FORD—No comment needed



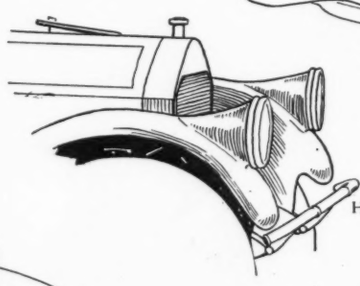
PAIGE—V-shaped radiator, diamond-shaped nameplate and Moto-Meter



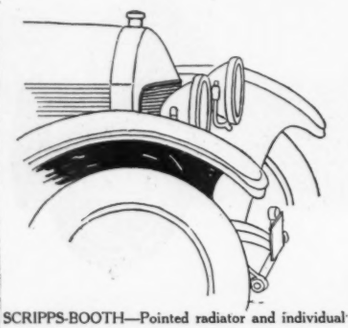
WHITE—Irregular hood shape



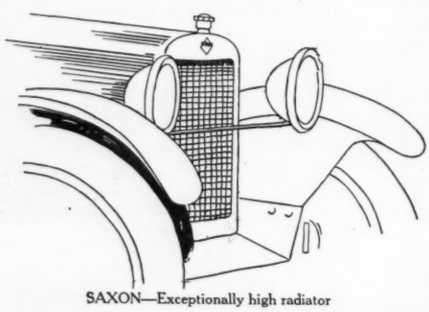
CHALMERS—Chalmers monogram in corner of radiator



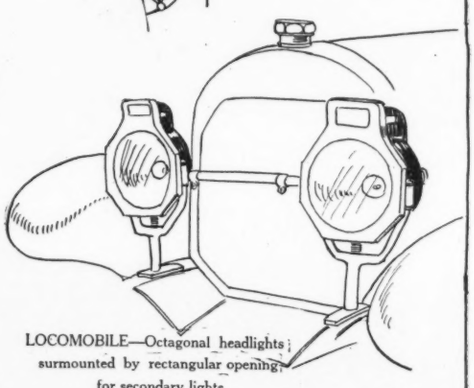
PIERCE-ARROW—Headlights a part of fenders



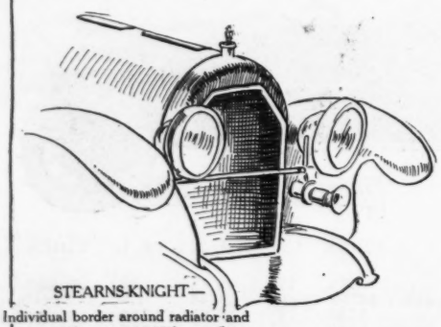
SCRIPPS-BOOTH—Pointed radiator and individual lines



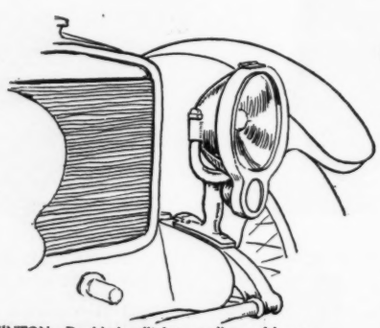
SAXON—Exceptionally high radiator



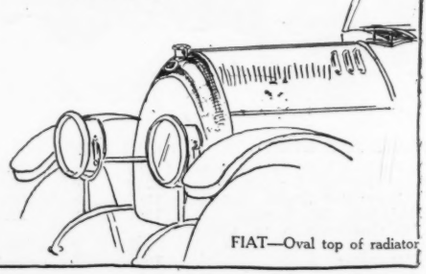
LOCOMOBILE—Octagonal headlights surmounted by rectangular opening for secondary lights



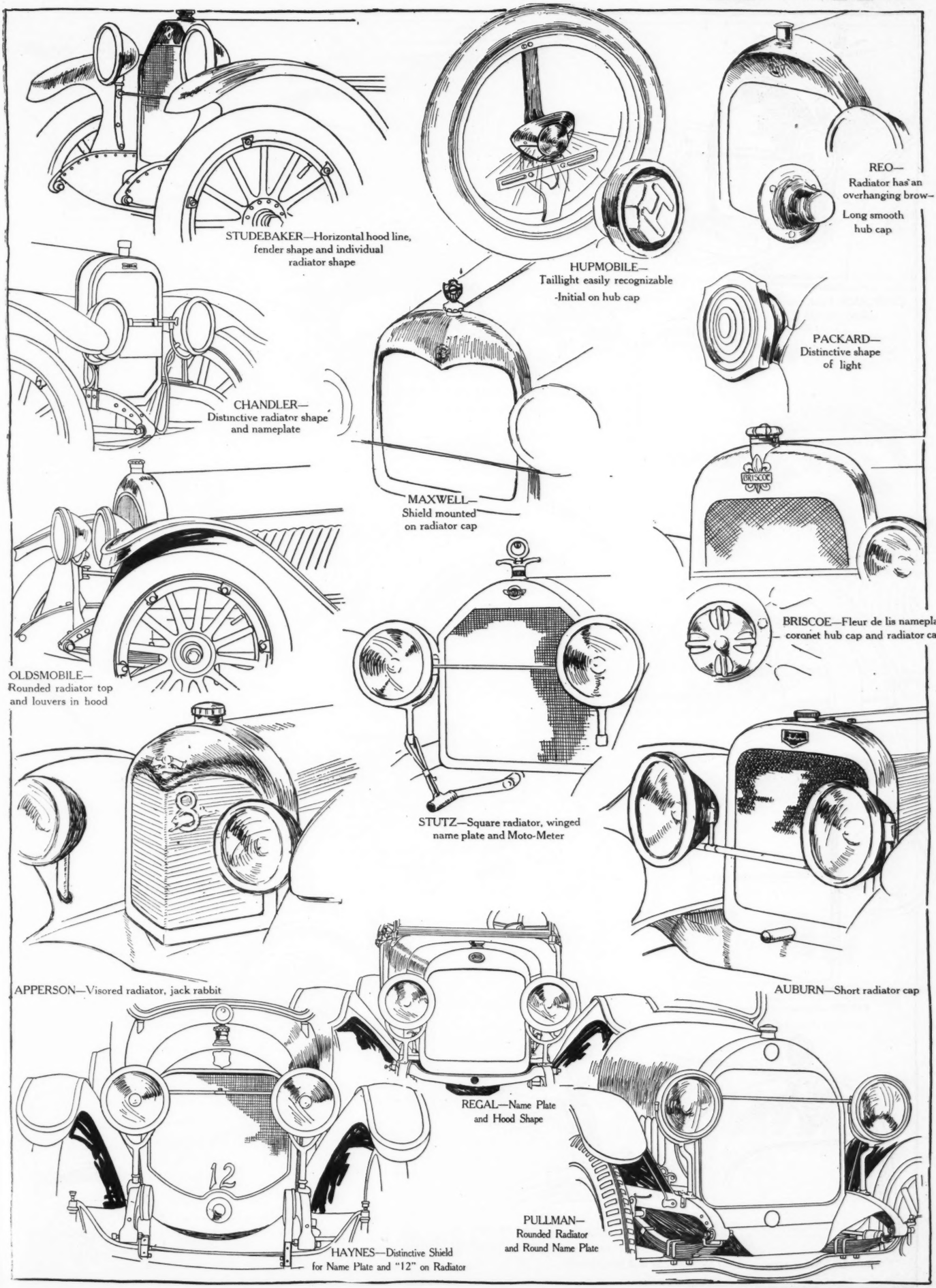
STEARNS-KNIGHT—Individual border around radiator and radiator cap surmounted by Knight

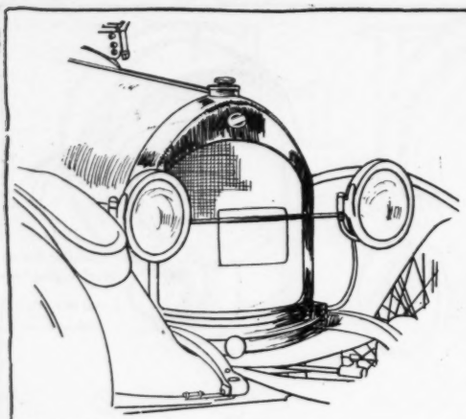


WINTON—Double headlights, small round lenses below main ones; long, squared hood

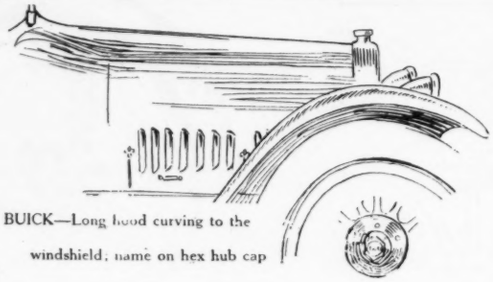


FIAT—Oval top of radiator

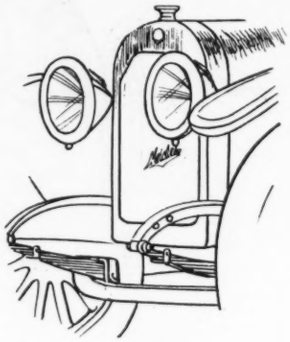

STUDEBAKER—Horizontal hood line, fender shape and individual radiator shape
HUPMOBILE—Taillight easily recognizable -Initial on hub cap
REO—Radiator has an overhanging brow—Long smooth hub cap
CHANDLER—Distinctive radiator shape and nameplate
PACKARD—Distinctive shape of light
MAXWELL—Shield mounted on radiator cap
BRISCOE
BRISCOE—Fleur de lis nameplate, coronet hub cap and radiator cap
OLDSMOBILE—Rounded radiator top and louvers in hood
STUTZ—Square radiator, winged name plate and Moto-Meter
APPERSON—Visored radiator, jack rabbit
AUBURN—Short radiator cap
REGAL—Name Plate and Hood Shape
12
HAYNES—Distinctive Shield for Name Plate and "12" on Radiator
PULLMAN—Rounded Radiator and Round Name Plate



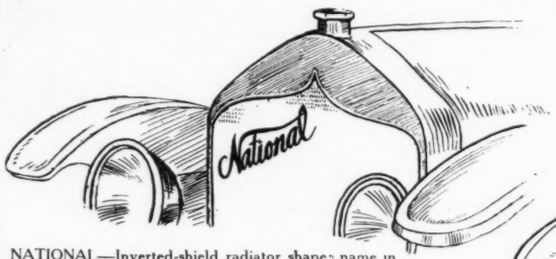
OVERLAND—Hood contour, radiator cap lock



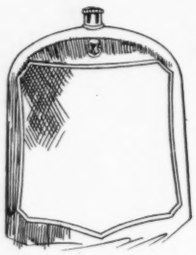
BUICK—Long hood curving to the windshield; name on hex hub cap



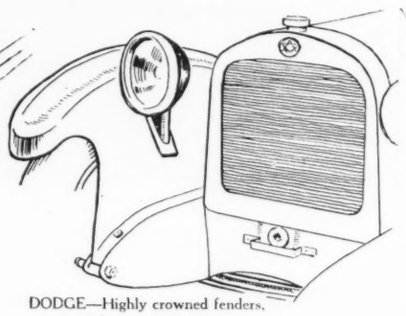
MITCHELL—Script name on radiator



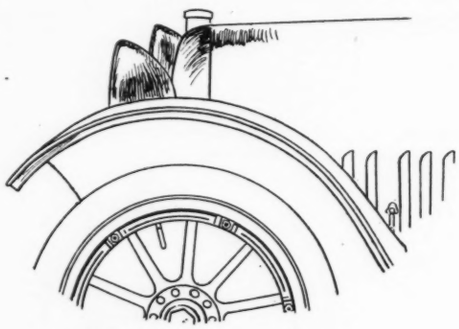
NATIONAL—Inverted-shield radiator shape; name in script across radiator



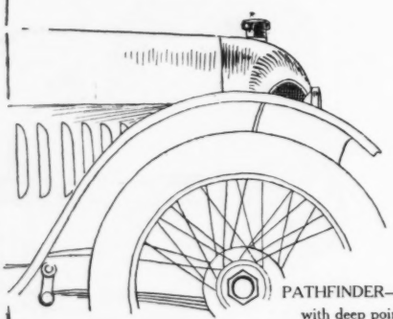
KING—Radiator same shape as nameplate shield



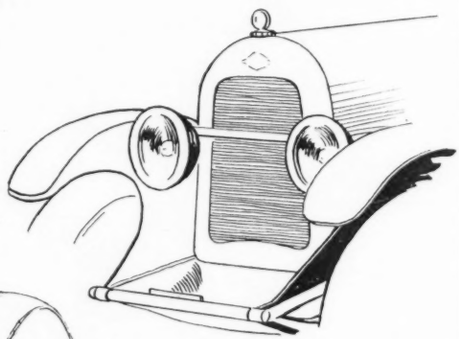
DODGE—Highly crowned fenders, six-pointed star with monogram



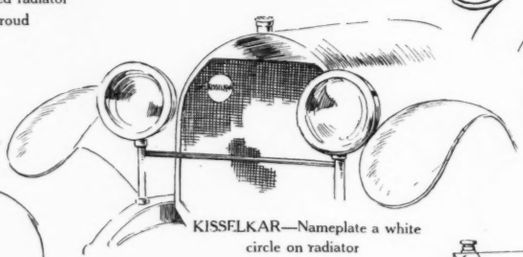
VELIE—Radiator hood line and lamp



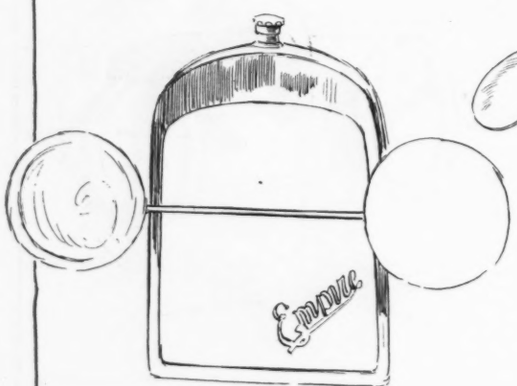
PATHFINDER—Pointed radiator with deep pointed shroud



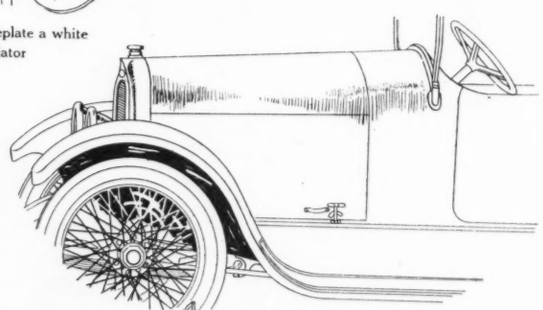
MONROE—With diamond-shaped nameplate



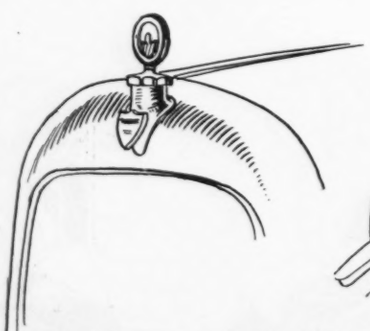
KISSELKAR—Nameplate a white circle on radiator



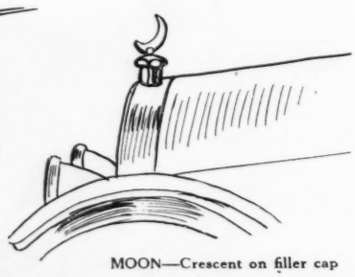
EMPIRE—Displays its name on the radiator



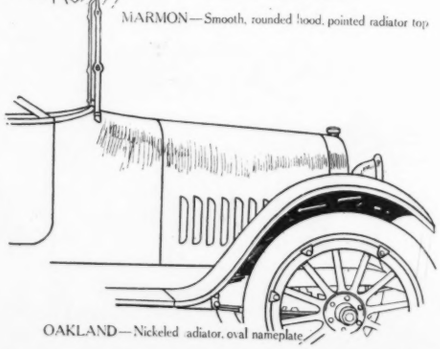
MARMON—Smooth, rounded hood, pointed radiator top



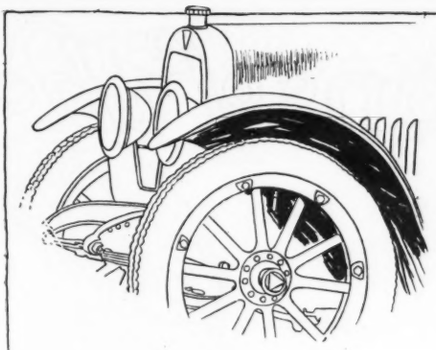
MERCER—Name plate, a shield on filler cap and Moto-Meter



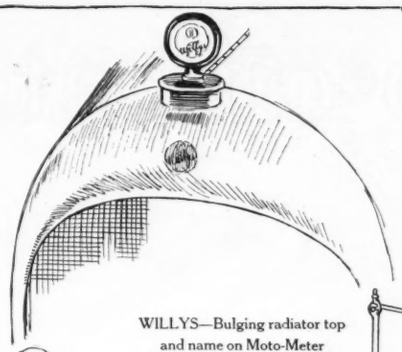
MOON—Crescent on filler cap



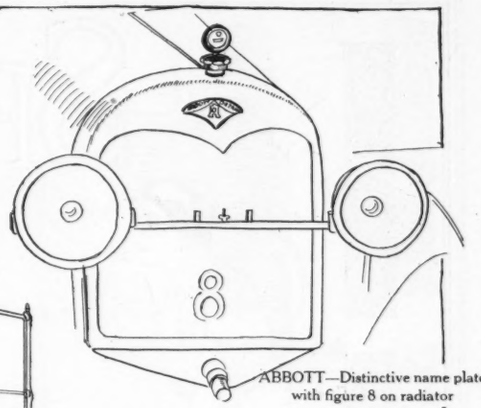
OAKLAND—Nickeled radiator, oval nameplate



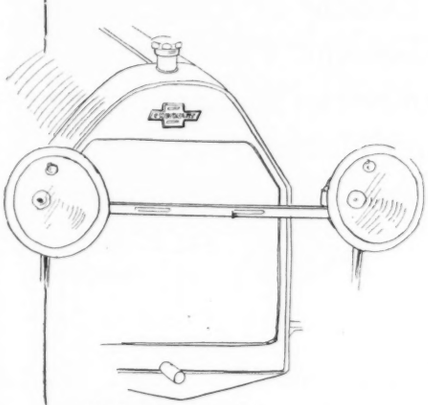
HUDSON—Triangle on the radiator and hub cap



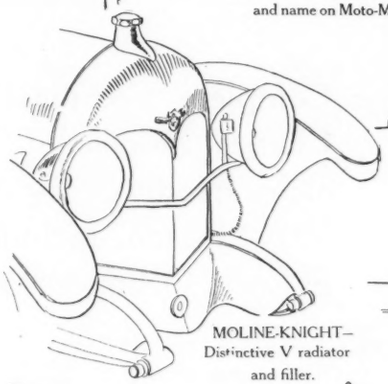
WILLYS—Bulging radiator top and name on Moto-Meter



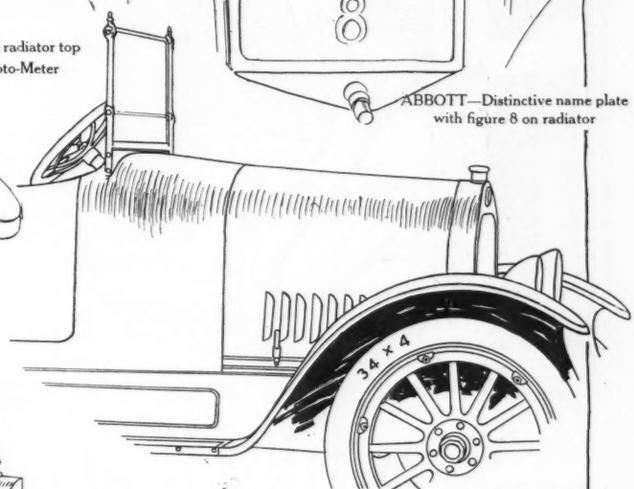
ABBOTT—Distinctive name plate with figure 8 on radiator



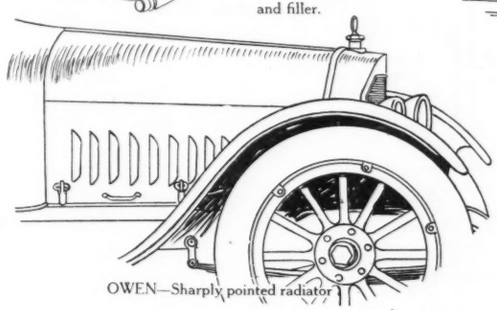
CHEVROLET—Name plate



MOLINE-KNIGHT—Distinctive V radiator and filler.

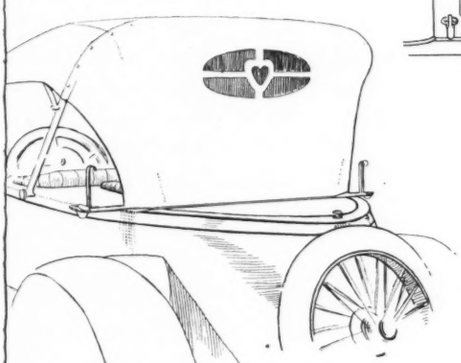


JEFFERY—High, narrow radiator; short louvres

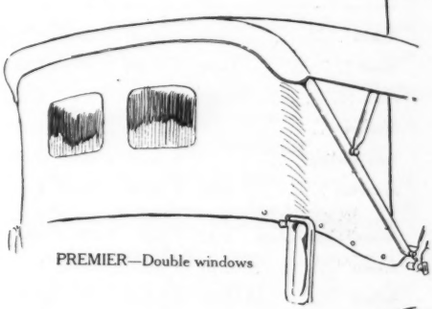


OWEN—Sharply pointed radiator

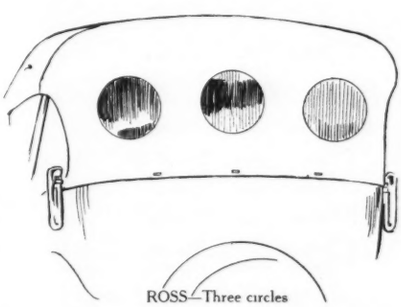
Individuality in Rear Curtains



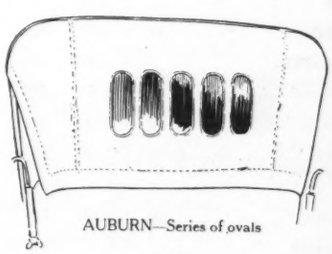
CROW ELKHART—The heart



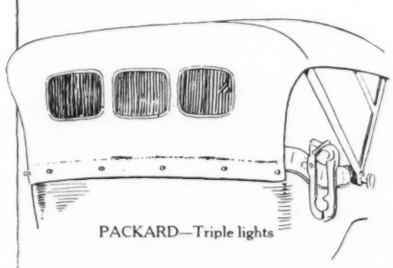
PREMIER—Double windows



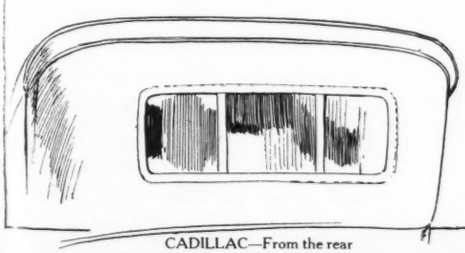
ROSS—Three circles



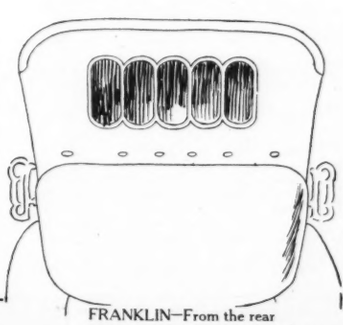
AUBURN—Series of ovals



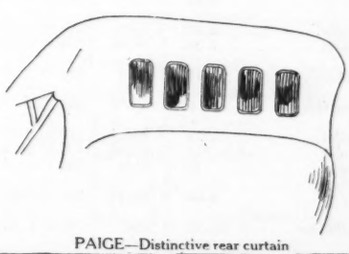
PACKARD—Triple lights



CADILLAC—From the rear

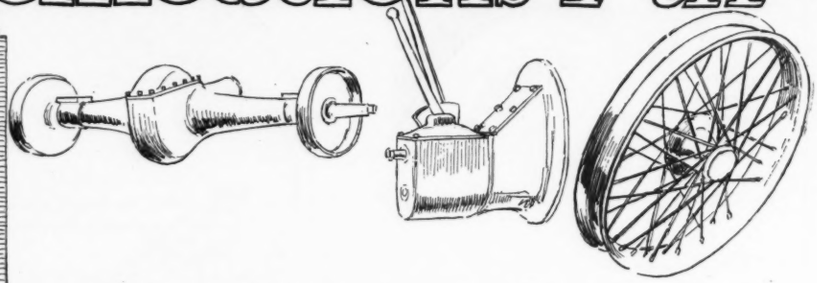


FRANKLIN—From the rear



PAIGE—Distinctive rear curtain

Specifications of the

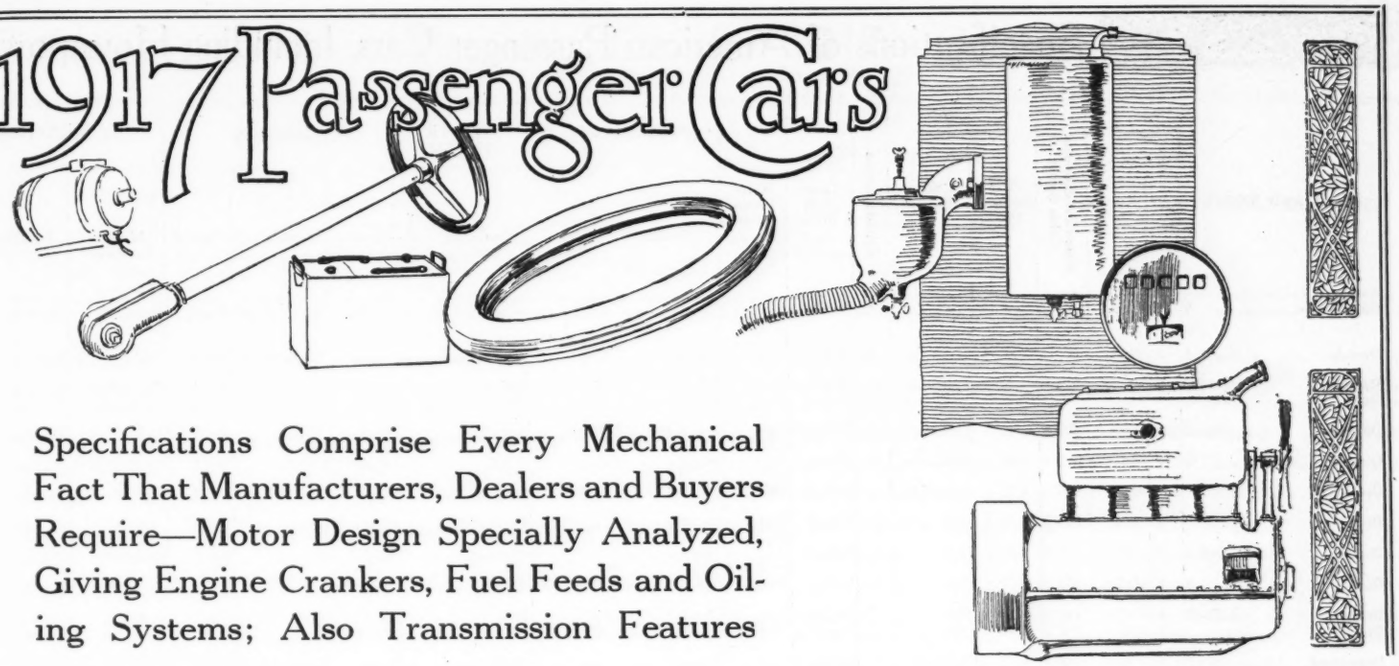


Complete Technical Details of Each of the Chassis Models of Gasoline Passenger Vehicles Produced by American Makers for the 1917 Season, Including Horsepower Ratings of Each, Cylinder Dimensions and Equipment

MAKE AND MODEL	No. of Cylinders	Bore and Stroke Inches	Piston Displacement, Cubic Inches	Gear Ratio on Direct	Make of Engine	Cylinder Shape	Cam-shaft Drive	Water Circu-lation	LUBRICATION		ELECTRIC SYSTEM		IGNITION			CARBURETION	
									System	Type of Pump	Generator Make	Voltage	System	Make	Control	Make of Carbureter	Fuel Feed
Abbott.....6-44	6	3½x4½	224.0	4.75-1	Continent..	L	Helical..	Cent....	Splash-Pres....	Piston....	Remy.....	6	Single...	Remy.....	Hand...	Stromberg...	Vacuum.....
Aland.....14-60	4	3 x5½	155.5	4.33-1	Own.....	I	Bevel...	Ther....	Pressure.....	Gear.....	U.S.L.....	12	Single...	Eisemann....	Hand...	Zenith.....	Vacuum.....
Allen.....Classic	4	3¾x5	220.9	4.00-1	Own.....	L	Helical..	Ther....	Circ-Spl.....	Piston....	Westinghouse	6	Single...	Westinghouse	Hand...	Stromberg...	Vacuum.....
American.....A	6	3 x5	212.0	4.42-1	Amco....	L	Helical..	Cent....	Circ-Spl.....	Piston....	G&D.....	6	Single...	G&D.....	Hand...	Zenith.....	Carter.....
Ams-Sterling.....	4	3½x4½	138.1	4.25-1	LeRoi....	L	Helical..	Ther....	Splash-Pres....	Piston....	Bosch.....	12	Single...	Bosch.....	Hand...	Stromberg...	Gravity.....
Anderson.....6-40	6	3½x4½	224.0	4.42-1	Continent..	L	Helical..	Cent....	Splash-Pres....	Piston....	Westinghouse	6	Single...	Westinghouse	Hand...	Own.....	Gravity.....
Apperson Roadaplane...6-17	6	3½x5	288.6	4.25-1	Own.....	L	Helical..	Cent....	Pressure.....	Gear.....	Bijur.....	6	Dual....	Remy.....	Hand...	Rayfield.....	Vacuum.....
Apperson Roadaplane...8-17	8	3½x5	306.8	4.64-1	Own.....	L	Helical..	Ther....	Pressure.....	Gear.....	Bijur.....	6	Dual....	Remy.....	Hand...	Rayfield.....	Vacuum.....
Arbenz.....25	4	3½x5	165.9	4.25-1	Lycoming..	L	Helical..	Ther....	Splash.....	Piston....	Apco.....	6	Single...	Apco.....	Hand...	Carter.....	Gravity.....
Auburn.....6-39	6	3½x5	230.1	4.42-1	Teetor....	L	Helical..	Cent....	Circ-Spl.....	Piston....	Remy.....	6	Single...	Remy.....	Hand...	Rayfield.....	Vacuum.....
Auburn.....6-44	6	3½x5½	303.1	4.00-1	Continent..	L	Helical..	Cent....	Circ-Spl.....	Piston....	Delco.....	6	Single...	Delco.....	H&A....	Rayfield.....	Vacuum.....
Austin Highway King.....	12	2½x5	389.5	3.75-1	Weidely...	I	Helical..	Cent....	Pressure.....	Gear.....	Delco.....	6	Single...	Delco.....	Hand...	Stromberg..	Vacuum.....
Bell.....17	4	3½x5	192.4	4.25-1	Lycoming..	L	Helical..	Ther....	Circ-Spl.....	Piston....	G&D.....	6	Single...	At Kent.....	Hand...	Carter.....	Vacuum.....
Biddle.....D	4	3¾x5½	226.4	4.00-1	Special....	L	Helical..	Ther....	Circ-Spl.....	Gear.....	G&D.....	6	Single...	.....	Hand...	Zenith.....	Vacuum.....
Bour-Davis.....	6	3½x4½	224.0	4.42-1	Continent..	L	Spur....	Cent....	Splash-Pres....	Piston....	G&D.....	6	Single...	G&D.....	Hand...	Stromberg...	Vacuum.....
Brewster-Knight.....	4	4 x5½	276.5	4.50-1	Own.....	I	Chain...	Cent....	Pressure.....	Gear.....	U.S.L.....	12	Single...	Bosch.....	Hand...	Zenith.....	Vacuum.....
Briscoe.....BA-24	4	3 7/16x5½	163.5	4.23-1	Own.....	L	Helical..	Ther....	Circ-Spl.....	Piston....	Splitdorf....	6	Single...	Conn.....	Hand...	.....	Gravity.....
Buick.....D-34, D-35	4	3⅜x4¾	170.0	4.08-1	Own.....	I	Helical..	Cent....	Circ-Spl.....	Piston....	Delco.....	6	Single...	Delco.....	Hand...	Marvel.....	Vacuum.....
Buick D-44, D-45, D-46, D-47	6	3¼x4½	224.0	4.08-1	Own.....	I	Helical..	Cent....	Circ-Spl.....	Gear.....	Delco.....	6	Single...	Delco.....	H&A....	Marvel.....	Vacuum.....
Cadillac.....55	8	3⅛x5½	314.4	4.37-1	Own.....	L	Chain...	Cent....	Pressure.....	Gear.....	Delco.....	6	Single...	Delco.....	Atmtc...	Own.....	Pressure.....
Cameron.....	6	3 x5	212.0	4.00-1	Amco....	L	Helical..	Cent....	Splash-Pres....	Piston....	G&D.....	6	Single...	G&D.....	Hand...	Zenith.....	Vacuum.....
Case.....T-17	4	3⅜x6	247.7	4.40-1	Own.....	L	Helical..	Ther....	Pressure.....	Piston....	Auto-Lite....	6	Single...	Conn.....	Hand...	Rayfield.....	Gravity.....
Chalmers.....6-30	6	3½x4½	224.0	4.75-1	Own.....	L	Helical..	Ther....	Splash-Pres....	Gear.....	Westinghouse	6	Single...	Remy.....	Hand...	Stromberg...	Vacuum.....
Chalmers.....6-30	6	3½x4½	224.0	5.18-1	Own.....	L	Helical..	Ther....	Splash-Pres....	Gear.....	Westinghouse	6	Single...	Remy.....	Hand...	Stromberg...	Vacuum.....
Chandler.....17	6	3¾x5	268.4	3.40-1	Own.....	I	Chain...	Cent....	Circ-Spl.....	Piston....	G&D.....	6	Single...	Bosch.....	Hand...	Rayfield.....	Vacuum.....
Charter Oak.....A	6	4 x5½	414.7	3.77-1	Hersh-Sp..	T	Spur....	Cent....	Pressure.....	Gear.....	Westinghouse	6	Double-..	Bosch.....	Hand...	Rayfield.....	Gravity.....
Chevrolet.....490	4	3½x4	170.9	3.67-1	Own.....	I	Helical..	Ther....	Splash-Pres....	Piston....	Auto-Lite....	6	Single...	Conn.....	Hand...	Zenith.....	Gravity.....
Chevrolet.....F-5, F-2	4	3½x4	170.9	4.25-1	Own.....	I	Helical..	Ther....	Splash-Pres....	Piston....	Auto-Lite....	6	Single...	Conn.....	Hand...	Zenith.....	Vacuum.....
Chevrolet.....D	8	3¾x4	286.3	4.25-1	Own.....	I	Helical..	Cent....	Circ-Spl.....	Piston....	Auto-Lite....	6	Single...	Conn.....	Hand...	.....	Vacuum.....
Cole.....8-60	8	3½x4½	346.3	4.45-1	Northway..	L	Spur....	Cent....	Pressure.....	Gear.....	Delco.....	6	Double-..	Delco.....	H&A...	Stromberg...	Vacuum.....
Crow-Elkhart.....CE-35	4	3½x5	192.4	4.25-1	Lycoming..	L	Helical..	Ther....	Circ-Spl.....	Piston....	Dyneto.....	6	Single...	Conn.....	Hand...	Zenith.....	Gravity.....

ABBREVIATIONS:—Make of Engine: Continental, Continent; Herschell-Spillman, Hersh-Sp; Golden, Belknap & Swartz, G.B.&S.; Massnick-Phipps, Mass-Ph. **Cylinder Shape:** L-Head, L; I-Head, I; T-Head, T. **Camshaft Drive:** Spur Gears, Spur. **Water Circulation:** Centrifugal, Cent; Thermo-syphon, Ther. **Lubrication System:** Splash-Pressure, Splash-Pres; Circulating-Splash, Circ-Spl. **Oil Pump Type:** Impeller, Imp. **Electric System:** Ward Leonard, Ward-L; Gray & Davis, G & D; Allis-Chalmers, Allis-Ch; Leece-Neville, Leece-N. **Ignition System:** Dual-Double, Dual-D. **Ignition Make:** Atwater Kent, At Kent. **Ignition Control:** Hand and Automatic, H&A; Automatic, Atmtc. **Make of Carbureter:** Reichenbach, Reichbch; Longuemare, Longmare. **Clutch Type:** Multiple Disk, Mul-D. **Gearset Type:** Selective, Sel; Planetary, Plan; Friction, Fric. **Gearset Location:** Unit with Motor, Unit M; Unit with Axle, Unit X; Amidship, Amid; Unit with Torque Tube, Unit T. **Final Drive:** Spiral.

1917 Passenger Cars



Specifications Comprise Every Mechanical Fact That Manufacturers, Dealers and Buyers Require—Motor Design Specially Analyzed, Giving Engine Crankers, Fuel Feeds and Oiling Systems; Also Transmission Features

TRANSMISSION								RUNNING GEAR						CRANKSHAFT BEARINGS		BEARINGS			
Clutch Type	GEARSET Type	GEARSET Location	GEARSET Forward Sp'ds	Final Drive	Car Drives Through	Rear Axle Type	Make of Rear Axle	Torque Taken By	Wheelbase	TIRES Front	TIRES Rear	Wheels	Rear Springs	Make of Speedometer	Number	Gearset	Rear Axle	Front Wheel	MAKE AND MODEL
Plate	Sel	Unit M.	3	Sp.B	Springs	¾ Float	Salisbury	Springs	122	32x4	32x4	Wood	S-E	Stewart	Plain	3	Ball	Roll	Roll	Abbott 6-44
Disk	Sel	Unit M.	3	Sp.B	Springs	Semi-F	Timken	Springs	122	33x4	33x4	Wire	S-E	VanSicklen	Plain	3	Ball	Roll	Ball	Aland 14-60
Cone	Sel	Unit M.	3	Bevel	Springs	Float	Adams	Tor.T	112	32x3½	32x3½	Wood	S-E	Stewart	Plain	2	B&P	Ball	Ball	Allen Classic
Plate	Sel	Unit M.	3	Sp.B	Springs	¾ Float	Salisbury	Springs	122	32x4	32x4	Wood	S-E	VanSicklen	Plain	3	B&P	B&R	Ball	American A
Plate	Sel	Unit M.	3	Bevel	Springs	Semi-F	Special	Springs	110	30x3½	30x3½	Wood	S-E	Warner	Plain	...	Roll	Roll	Ball	Ams-Sterling
Plate	Sel	Unit M.	3	Bevel	Springs	Semi-F	Mott	Springs	120	33x4	33x4	Wood	S-E	Stewart	Plain	3	Ball	Ball	Ball	Anderson 6-40
Plate	Sel	Amid		Sp.B	Springs	Float	Own	Springs	130	34x4	34x4	Wood	¾ Ell	VanSicklen	Plain	4	Roll	Roll	Roll	Apperson Roadaplane 6-17
Plate	Sel	Amid	3	Sp.B	Springs	Float	Own	Springs	130	35x4½	35x4½	Wood	¾ Ell	VanSicklen	Plain	3	Roll	Roll	Roll	Apperson Roadaplane 8-17
Cone	Sel	Unit M.	3	Bevel	Springs	Float	Gemco		108	30x3½	30x3½	Wood	Cant	Carter	Plain	2	Ball	Roll	Ball	Arbenz 25
Plate	Sel	Unit M.	3	Sp.B	Springs	¾ Float	Columbia	Tor.T	120	34x4	34x4	Wood	S-E		Plain	3	B&P	Roll	Ball	Auburn 6-39
Plate	Sel	Unit M.		Sp.B	Springs	¾ Float	Columbia	Tor.T	131	35x4½	35x4½	Wood	Cant		Plain	3	Ball	Roll	Ball	Auburn 6-44
Disk	Sel	Unit M.	6	Sp.B	Springs	Float	Own	Springs	142½	34x4½	34x4½	Wood*	Cant	Warner	Plain	4	Ball	B&R	Roll	Austin Highway King
Disk	Sel	Unit M.	3	Bevel	Springs	¾ Float	Adams	Springs	112	31x4	31x4	Wood	¾ Ell	Stewart	Plain	2	Roll	Roll	Ball	Bell 17
Plate	Sel	Unit M.	4	Bevel	Springs	¾ Float	Special	Springs	122	32x4	32x4	Wire	¾ Ell	Warner	Plain	3	Ball	B&R	Ball	Biddle D
Plate	Sel	Unit M.	3	Sp.B	Springs	¾ Float	Salisbury	Springs	118	32x4	32x4	Opt	S-E	Warner	Plain	3	B&P	B&R	Ball	Bour-Davis
Cone	Sel	Unit-T.	3	Sp.B	Tor.T	Float	Own	Tor.T	125	34x4½	34x4½	Wood	Cant	Stewart	Plain	3	Ball	Ball	Roll	Brewster-Knight
Cone	Sel	Unit X	3	Bevel	Springs	Semi-F	Own	Tor.R	105	30x3½	30x3½	Wood	Ell	Stewart	Plain	2	BR&P	B&R	Ball	Briscoe BA-24
Cone	Sel	Unit M.	3	Bevel	Springs	¾ Float	West.M	Tor.T	106	31x4	31x4	Wood	S-E	Stewart	Plain	3	B&R	B&R	Ball	Buick D-34, D-35
Cone	Sel	Unit M.	3	Sp.B	Tor.T	Float	West.M	Tor.T	115	34x4	34x4	Wood	Cant	Stewart	Plain	4	Ball	B&R	Ball	Buick D-44, D-45, D-46, D-47
Disk	Sel	Unit M.	3	Sp.B	Springs	Float	Timken	Tor.M	125	36x4½	36x4½	Wood	Plat	Warner	Plain	3	Ball	Roll	Roll	Cadillac 55
Plate	Sel	Unit X	3	Sp.B	Rad.Rd	¾ Float	Own	Tor.T	122	32x4	32x4	Wire	Cant		Plain	3	Ball	Ball	Ball	Cameron
Cone	Sel	Unit M.	3	Sp.B	Tor.T	¾ Float	Salisbury	Tor.T	120	34x4	34x4	Wood	Cant	Stewart	Plain	3	R&P	Roll	Roll	Case T-17
Plate	Sel	Unit M.	3	Sp.B	Springs	Semi-F	Timken	Springs	115	32x4	32x4	Wood	S-E	Stewart	Plain	3	Roll	Roll	Roll	Chalmers 6-30
Disk	Sel	Unit M.	3	Sp.B	Springs	Semi-F	Timken	Springs	122	34x4	34x4	Wood	S-E	Stewart	Plain	3	Roll	Roll	Roll	Chalmers 6-30
Disk	Sel	Unit M.	3	Sp.B	Tor.T	Float	Own	Tor.T	123	34x4	34x4	Wood	S-E	Warner	Plain	3	Ball	Ball	Roll	Chandler 17
Disk	Sel	Unit M.	4	Sp.B	Springs	Float	Timken	Tor.R	135	35x5	35x5	Wire†	S-E		Plain	3	Roll	Roll	Roll	Charter Oak A
Cone	Sel	Unit M.	3	Bevel	Springs	¾ Float	Own	Springs	102	30x3½	30x3½	Wood	Cant	Stewart	Plain	3	Ball	Roll	Ball	Chevrolet 490
Cone	Sel	Unit M.	3	Bevel	Springs	¾ Float	Own	Springs	112	32x3½	32x3½	Wood	Cant	Stewart	Plain	3	B&P	Roll	C&C	Chevrolet F-5, F-2
Cone	Sel	Unit M.	3	Sp.B	Springs	¾ Float	Own	Tor.T	120	34x4	34x4	Wood	Cant	Stewart	Plain	3	B&P	Roll	C&C	Chevrolet D
Cone	Sel	Unit M.	3	Sp.B	Springs	Float	Columbia	Springs	127	35x4½	35x4½	Wood	S-E	Warner	Plain	3	B&P	Roll	Roll	Cole 860
Plate	Sel	Unit X	3	Bevel	Tor. T	Float	Peru	Tor.T	113	32x3½	32x3½	Opt	¾ Ell	Stewart	Plain	2	Ball	Roll	Ball	Crow-Elkhart CE-35

Bevel, Sp.B. **Car Drives Through:** Radius Rods, Rad.Rd; Torsion Tube, Tor.T; Torque Arm, Tor. A. **Rear Axle:** Floating, Float; Semi-Floating, Semi-F; Three-quarter Floating, ¾ Float. **Make of Axle:** Weston-Mott, West.M; Walker-Weiss, W.Weiss. **Rear Springs:** Elliptic, Ell; Three-quarter Elliptic ¾ Ell; Semi-Elliptic, S-E; Cantilever, Cant; Platform, Plat; Transverse Semi-Elliptic, Tr.S-E. **Bearings:** Roller, Roll; Ball and Roller, B&R; Ball and Plain, B&P; Ball, Roller and Plain, BR&P; Cup and Cone, C&C. **Make of Speedometer:** Johns-Manville, Johns-Man. **Fuel Feed;** Stewart Vacuum Tank, Vacuum.

*Wire special equipment. †Wood optional.

Specifications of American Passenger Cars, Including Horsepower,

MAKE AND MODEL	No. of Cylinders	Bore and Stroke, Inches	Piston Displacement Cubic Inches	Gear Ratio on Direct	Make of Engine	Cylinder Shape	Cam-shaft Drive	Water Circu-lation	LUBRICATION		ELECTRIC SYSTEM		IGNITION			CARBURETION	
									System	Type of Pump	Generator Make	Voltage	System	Make	Control	Make of Carbureter	Fuel Feed
Cunningham V	8	3¾x5	441.7	4.08–1	Own	L	Helical	Cent	Pressure	Gear	Westinghouse	6	Single	Westinghouse	Hand	Stromberg	Vacuum
Daniels A	8	3½x5	331.8	4.42–1	Hersh-Sp	L	Helical	Cent	Pressure	Gear	Westinghouse	6	Single	Westinghouse	Hand	Zenith	Vacuum
Davis Light Six	6	3½x4½	224.0	4.42–1	Continent	L	Helical	Cent	Splash-Pres	Piston	Delco	6	Dual	Delco	Hand	Stromberg	Vacuum
Davis Big Six	6	3½x5½	303.1	4.42–1	Continent	L	Helical	Cent	Splash-Pres	Gear	Delco	6	Dual	Delco	Atmtc	Stromberg	Vacuum
Detroiter Six-45	6	3½x4½	224.0	4.75–1	Continent	L	Helical	Cent	Splash-Pres	Piston	Auto-Lite	7	Single	Conn	Hand	Ball	Vacuum
Dispatch G	4	3¾x5	220.9	4.09–1	Wisconsin	L	Helical	Ther	Pressure	Gear	U.S.L.	12	Single	Bosch	Hand	Rayfield	Vacuum
Dixie Flyer	4	3½x5	165.9	4.75–1	Lycoming	L	Helical	Ther	Circ-Spl	Piston	Dyneto	6	Single	Conn	Hand	Carter	Vacuum
Dodge	4	3⅞x4½	212.3	3.50–1	Own	L	Helical	Cent	Circ-Spl	Imp	North East	12	Single	Delco	Atmtc	Stewart	Vacuum
Dorris 1–B–6	6	4 x5	377.0	4.08–1	Own	I	Helical	Cent	Pressure	Gear	Westinghouse	6	Single	Bosch	Hand	Stromberg	Vacuum
Dort 9	4	3½x5	165.9	4.07–1	Own	L	Helical	Ther	Circ-Spl	Piston	Westinghouse	6	Single	Conn	Hand	Carter	Gravity
Drexel R–30–35	4	3½x5	192.4	4.25–1	Own	I	Chain	Ther	Circ-Spl	Piston	Bijur	6	Single	Bosch	Hand	Stromberg	Gravity
Drexel	4	3½x5	192.4	4.42–1	Own	I	Chain	Ther	Splash-Pres	Piston	Bijur	6	Single	Bosch	Hand	Stromberg	Vacuum
Drummond B–17	8	3 x5	282.7	4.42–1	Hersh-Sp	L	Helical	Cent	Pressure	Gear	Westinghouse	6	Single	Westinghouse	Hand	Zenith	Vacuum
Elcar D.E.F.	4	3½x5	192.4	4.08–1	Lycoming	L	Helical	Ther	Circ-Spl	Piston	Dyneto	6	Single	Delco	H&A	Carter	Vacuum
Elgin	6	3 x4¼	180.2	4.50–1	Falls	I	Helical	Ther	Circ-Spl	Piston	Wagner	6	Single	Remy	Hand	Stromberg	Vacuum
Emerson	4	3¾x4	176.7	4.25–1	Own	L	Spur	Ther	Non-Splash	Gear	Apple	6	Single	At Kent	Hand	Kingston	Vacuum
Empire 45	4	3½x5	235.8	4.00–1	Teetor	T	Helical	Ther	Circ-Spl		Auto-Lite	6	Single	Auto-Lite	Hand	Stromberg	Vacuum
Empire 60–R	6	3½x4½	224.0	4.42–1	Continent	L	Helical	Cent	Splash-Pres	Piston	Auto-Lite	6	Single	Conn	Hand	Stromberg	Vacuum
Empire 70	6	3½x4½	224.0	4.58–1	Continent	L	Helical	Cent	Splash-Pres		Auto-Lite	6	Single	Conn	Hand	Stromberg	Vacuum
Enger Twin Unit Twelve	12	2 11/16x3½	238.3	4.75–1	Own	I	Chain	Gear	Pressure	Gear	Westinghouse	6	Single	Remy	Hand	Stromberg	Gravity
Fiat 55–E–17	4	5½x6¾	557.0	2.75–1	Own	L	Helical	Cent	Pressure	Gear	Westinghouse	6	Double	Westinghouse	Hand	Zenith	Pressure
Ford T	4	3¾x4	176.7	3.63–1	Own	L	Spur	Ther	Splash-Grav	Flywheel	Own	12	Single	Own	Hand	Holley / Kingston	Gravity
Franklin 9	6	3½x4	199.1	3.92–1	Own	I	Helical	Air	Pressure	Gear	Dyneto	12	Single	At Kent	Atmtc	Own	Vacuum
F.R.P 45–A	4	4⅜x6¾	448.0	2.25–1	Own	I	Worm	Cent	Splash-Pres	Piston	Bosch	12	2-Pt	Bosch	Hand	Longmare	Pressure
F.R.P 45–B	4	4⅜x6¾	448.0	3.00–1	Own	I	Worm	Cent	Splash-Pres	Piston	Bosch	12	2-Pt	Bosch	Hand	Longmare	Pressure
Geneva	6	4 x5½	414.7	3.77–1	Hersh-Sp	T	Helical	Cent	Splash-Pres	Gear	Westinghouse	6	Single	Eisemann	Hand	Rayfield	Vacuum
Glide 6–40	6	3½x5	230.1	4.64–1	Rutenber	L	Helical	Cent	Splash-Pres	Piston	Westinghouse	6	Single	Westinghouse	Hand	Rayfield	Vacuum
Grant K	6	3 x4¼	180.2	4.50–1	Own	I	Helical	Ther	Non-Splash	Piston	Wagner	6	Single	Remy	Atmtc	Stromberg	Vacuum
Hackett Four	4	3¾x4¼	187.7	4.00–1	G.B.&S	L	Chain	Ther	Splash-Pres	Piston	G&D	6	Single	G&D	Hand		Vacuum
HAL 21A	12	2¾x5	389.5	4.64–1	Weidely	I	Helical	Cent	Pressure	Piston	Westinghouse	6	Single	Westinghouse	Hand	Stromberg	Vacuum
Harroun A–1	4	3½x5½	174.2	4.00–1	Own	L	Helical	Ther	Circ-Spl	Piston	Own	6	Single	Bosch	Hand	Bell	Gravity
Hatfield H	4	3⅞x4½	187.7	4.25–1	G.B.&S	L	Chain	Ther	Circ-Spl	Piston	Disco	12	Single	Conn	Hand	Stromberg	Vacuum
Harvard 2–T	4	3 x4¼	120.2	4.00–1	Sterling	L	Helical	Ther	Circ-Spl	Gear	Wagner	6	Dual		Hand	Zenith	Gravity
Haynes 36	6	3½x5	288.6	4.42–1	Own	L	Helical	Cent	Circ-Spl	Piston	Leece-N	6	Single	Remy	Hand	Rayfield	Vacuum
Haynes 37	6	3½x5	288.6	4.42–1	Own	L	Helical	Cent	Circ-Spl	Piston	Leece-N	6	Single	Remy	Hand	Rayfield	Vacuum
Haynes 40	12	2½x5	356.4	4.42–1	Own	I	Chain	Cent	Pressure	Gear	Leece-N	6	Single	Delco	H&A	Rayfield	Vacuum
Haynes 41	12	2½x5	356.4	4.42–1	Own	I	Chain	Cent	Pressure	Gear	Leece-N	6	Single	Delco	H&A	Rayfield	Vacuum
Hollier 186	6	3 x4¼	180.2	4.50–1	Falls	I	Helical	Ther	Circ-Spl	Gear	Allis-Ch	6	Single	Remy	Hand	Stewart	Vacuum
Hollier 178	8	3 x4¼	240.3	4.50–1	Own	I	Helical	Ther	Pressure	Gear	Aplco	6	Single	At Kent	Atmtc	Stewart	Vacuum
Homer Laughlin D	8	2½x3¾	120.0		Own	L	Chain	Ther	Circ-Spl		Disco	12	Single	At Kent	Atmtc	Ensign	Pressure
Howard	6	3½x4½	224.0	4.75–1	Continent	L	Helical	Cent	Splash-Pres	Piston		6	Single	Delco	Hand	Stromberg	Vacuum
Hudson Super-Six	6	3½x5	288.6	4.45–1	Own	L	Helical	Cent	Circ-Spl	Piston	Delco	6	Single	Delco	H&A	Own	Vacuum
Hupmobile NR	4	3¾x5½	242.9	4.64–1	Own	L	Chain	Ther	Splash-Pres	Flywheel	Westinghouse	6	Single	At Kent	H&A	Zenith	Gravity
Hupmobile NU	4	3¾x5½	242.9	4.64–1	Own	L	Chain	Ther	Splash-Pres	Flywheel	Westinghouse	6	Single	At Kent	H&A	Zenith	Gravity
Hupmobile N	4	3¾x5½	242.9	4.64–1	Own	L	Chain	Ther	Splash-Pres	Flywheel	Westinghouse	6	Single	At Kent	H&A	Zenith	Gravity
Hupmobile NQ	4	3¾x5½	242.9	4.64–1	Own	L	Chain	Ther	Splash-Pres	Flywheel	Westinghouse	6	Single	At Kent	H&A	Zenith	Gravity
Inter-State T	4	3½x5	192.4	4.00–1	Own	L	Helical	Ther	Circ-Spl	Gear	Remy	6	Single	Remy	Hand	Schebler	Gravity
Jackson Wolverine 349	8	3 x3½	197.9	4.75–1	Ferro	I	Helical	Ther	Pressure	Gear	Auto-Lite	6	Single	Auto-Lite	Hand	Zenith	Vacuum
Jeffery 472	4	3¾x5½	231.9	4.50–1	Own	L	Helical	Cent	Splash-Pres	Piston	Bijur	6	Single	Dixie	Hand	Stromberg	Vacuum
Jeffery 671	6	3½x4¾	267.0	4.50–1	Own	L	Chain	Cent	Splash-Pres	Gear	Bijur	6	Single	Dixie	Hand	Rayfield	Vacuum

ABBREVIATIONS:—**Make of Engine:** Continental, Continent; Herschell-Spillman, Hersh-Sp; Golden, Belknap & Swartz, G.B.&S.; Massnick-Phipps, Mass-Ph. **Cylinder Shape:** L-Head, L; I-Head, I; T-Head, T. **Camshaft Drive:** Spur Gears, Spur. **Water Circulation:** Centrifugal, Cent; Thermo-syphon, Ther. **Lubrication System:** Splash-Pressure, Splash-Pres; Circulating-Splash, Circ-Spl. **Oil Pump Type:** Impeller, Imp. **Electric System:** Ward Leonard, Ward-L; Gray & Davis, G & D; Allis-Chalmers, Allis-Ch; Leece-Neville, Leece-N. **Ignition System:** Dual-Double, Dual-D. **Ignition Make:** At-water Kent, At Kent. **Ignition Control:** Hand and Automatic, H&A; Automatic, Atmtc. **Make of Carbureter:** Reichenbach, Reichbch; Longuemare, Longmare. **Clutch Type:** Multiple Disk, Mul-D. **Gearset Type:** Selective, Sel; Planetary, Plan; Friction, Fric. **Gearset Location:** Unit with Motor, Unit M; Unit with Axle, Unit X; Amidship, Amid; Unit with Torque Tube, Unit T. **Final Drive:** Spiral

Carbureters, Crankers, Magnetos, Etc. for 1917—Continued

Clutch Type	TRANSMISSION: GEARSET Type	GEARSET Location	GEARSET Forward Sp'ds	Final Drive	Car Drives Through	Rear Axle Type	Make of Rear Axle	Torque Taken By	RUNNING GEAR: Wheelbase	TIRES Front	TIRES Rear	Wheels	Rear Springs	Make of Speedometer	Crankshaft Bearings Number	BEARINGS: Gearset	BEARINGS: Rear Axle	BEARINGS: Front Wheel	MAKE AND MODEL
Disk	Sel	Unit M.	3	Sp.B	Springs	Float		Tor.T	130	35x5	35x5	Wood	¾ Ell	Stewart	Plain 3	B&R		Roll	Cunningham V
Disk	Sel	Unit M.	3	Sp.B	Springs	¾ Float	Timken	Tor.T	127	34x4½	34x4½	Wood	S-E	Warner	Plain 3	B&R	Roll	Roll	Daniels A
Cone	Sel	Unit M.	3	Sp.B	Springs	¾ Float	Columbia	Springs	118	34x4	34x4	Wood	S-E	Stewart	Plain 3	Ball	Roll	Ball	Davis Light Six
Cone	Sel	Unit M.	3	Sp.B	Springs	Float	Columbia	Springs	124	34x4½	34x4½	Wood	S-E	Stewart	Plain 3	Ball	Roll	Roll	Davis Big Six
Plate	Sel	Unit M.	3	Sp.B	Springs	Semi-F	Timken	Springs	118	33x4	33x4	Wood	S-E	Stewart	Plain 3	B&P	Roll	Roll	Detroiter Six-45
Control	Unit	Amid	4	Dbl Ch	Rad.Rd	Dead	Own	Rad.Rd	120	36x3½	36x3½	Wood	Ell	Corbin	Plain 3	Ball	Ball	Ball	Dispatch G
Cone	Sel	Unit M.	3	Sp.B	Tor.T	Float	Peru	Tor.T	112	32x3½	32x3½	Wood	¾ Ell	VanSicklen	Plain 2	BR&P	B&R	Ball	Dixie Flyer
Disk	Sel	Unit M.	3	Sp.B	Springs	Float	Own	Tor.T	114	32x3½	32x3½	Wood	¾ Ell	Johns-Man	Plain 3	Ball	Roll	Roll	Dodge
Disk	Sel	Unit M.	3	Sp.B	Springs	Float	Timken	Tor.T	128	36x4½	36x4½	Wood	S-E	Warner	Plain 7	Roll	Roll	Roll	Dorris 1-B-6
Cone	Sel	Unit M.	3	Bevel	Springs	¾ Float	W-Weiss	Tor.T	105	30x3½	30x3½	Wood	Cant	Stewart	Plain 2	Ball	BR&P	Ball	Dort 9
Cone	Sel	Unit M.	3	Bevel	Tor.T	Float	Peru	Tor.T	112	33x4	33x4	Wood	¾ Ell	Stewart	Plain 2	Ball	Roll	Ball	Drexel R-30-35
Disk	Sel	Unit M.	3	Sp.B	Springs	Semi-F	Timken	Springs	118	34x4	34x4	Wood	S-E	Stewart	Plain 2	Ball	Roll	Roll	Drexel
Disk	Sel	Unit M.	3	Sp.B	Tor.T	Float	Columbia	Tor.T	120	34x4	34x4	Wood	Cant		Plain 3	Ball	Roll	Roll	Drummond B-17
Plate	Sel	Unit M.	3	Sp.B	Springs	Float	Salisbury	Springs	115	32x3½	32x3½	Opt	S-E	Stewart	Plain 2	B&P	B&R	Ball	Elcar D.E.F.
Plate	Sel	Unit M.	3	Sp.B	Springs	Float	Salisbury	Tor.A	116	33x4	33x4	Opt	Cant	Stewart	Plain 3	Ball	Ball	Ball	Elgin
Disk	Sel	Unit M.	3	Bevel	Springs	Semi-F	Own	Springs	110	30x3	30x3½	Wood	S-E	Extra	Plain 3	Ball	B&R	Ball	Emerson
Cone	Sel	Unit M.	3	Bevel	Springs	¾ Float	West.M	Tor.T	116	33x4	33x4	Wood	S-E		Plain 3	B&P	Roll	Ball	Empire 45
Cone	Sel	Unit M.	3	Bevel	Springs	¾ Float	West.M	Springs	120	34x4	34x4	Wood	¾ Ell		Plain	B&P	Roll	Ball	Empire 60-R
Plate	Sel	Unit M.	3	Sp.B	Springs	Float	Hess	Springs	120	34x4	34x4	Wood	¾ Ell		Plain 3	B&P	B&R	Ball	Empire 70
Plate	Sel	Unit M.	3	Sp.B	Springs	Float	Hess	Tor.T	116	32x4	32x4	Wood	Cant	Stewart	Plain 3	B&P	B&R	Ball	Enger Twin Unit Twelve
Disk	Sel	Amid	4	Bevel	Tor.T	Semi-F	Own	Tor.T	140	35x5	35x5	Wood	S-E	Warner	Plain 3	Ball	Ball	Ball	Fiat 55-E-17
Mul-D	Plan	Unit M.	2	Bevel	Tor.T	Semi-F	Own	Tor.T	100	30x3	30x3½	Wood	Tr.S-E	None	Plain 3	Plain	Roll	Ball	Ford T
Disk	Sel	Amid	3	Sp.B	Springs	Semi-F	Own	Springs	115	32x4	32x4	Wood	Ell	Warner	Plain 7	Ball	Ball	Ball	Franklin 5
Cone	Sel	Amid	4	Bevel	Springs	Float	Own	Tor.T	110	36x4½	36x5	Wire	S-E		Plain 3	Ball	Ball	Ball	F.R.P 45-A
Cone	Sel	Amid	4	Bevel	Springs	Float	Own	Tor.T	140	36x4½	36x5	Wire	S-E		Plain 3	Ball	Ball	Ball	F.R.P 45-B
Disk	Sel	Unit M.	4	Sp.B	Springs	Float	Timken	Springs	139	34x4½	34x4½	Opt	S-E	Warner	Plain 3	Roll	Roll	Roll	Geneva
Disk	Sel	Unit M.	3	Sp.B	Springs	¾ Float	Amer	Springs	119	34x4	34x4	Wood	¾ Ell	Stewart	Plain 3	B&P	Ball	Ball	Glide 6-40
Cone	Sel	Unit M.	3	Bevel	Tor.T	Float	Peru	Tor.T	112	32x3½	32x3½	Wood*	Cant	Stewart	Plain 3	B&P	B&R	Ball	Grant K
Disk	Sel	Unit M.	3	Bevel	Springs	¾ Float	W-Weiss	Springs	112	31x4	31x4	Wood	¾ Ell	Stewart	Plain 3	Roll	Roll	Ball	Hackett Four
Plate	Sel	Unit M.	3	Sp.B	Springs	Float	Timken	Springs	135	34x4½	34x4½	Opt	S-E		Plain 3	Ball	Roll	Roll	HAL 21A
Cone	Sel	Unit M.	3	Bevel	Springs	Float	Own	Tor.T	107	30x3½	30x3½	Wood	Cant		Plain 3	Ball		Roll	Harroun A-1
Disk	Sel	Unit M.	3	Bevel	Springs	Float	Peru	Springs	106	31x4	31x4	Wood	Cant	Stewart	Plain 3	Ball	Roll	Ball	Hatfield H
Cone	Sel	Unit M.	3	Bevel	Springs	Semi-F	Detroit	Springs	100	28x3	28x3	Opt	Cant		Plain	B&P	B&R	Ball	Harvard 2-T
Plate	Sel	Unit M.	3	Sp.B	Springs	¾ Float	Own	Springs	121	34x4	34x4	Wood	S-E	Stewart	Plain 3	Ball	Ball	Ball	Haynes 36
Plate	Sel	Unit M.	3	Sp.B	Springs	¾ Float	Own	Springs	127	35x4½	35x4½	Wood	S-E	Stewart	Plain 3	Ball	Ball	Ball	Haynes 37
Plate	Sel	Unit M.	3	Sp.B	Springs	¾ Float	Own	Springs	121	34x4½	34x4½	Wire	S-E	Warner	Plain 3	Ball	Ball	Ball	Haynes 40
Plate	Sel	Unit M.	3	Sp.B	Springs	¾ Float	Own	Springs	127	34x4½	34x4½	Wire	S-E	Warner	Plain 3	Ball	Ball	Ball	Haynes 41
Cone	Sel	Unit M.	3	Bevel	Tor.T	Float	Own	Springs	116	32x3½	32x3½	Wood	Cant	Stewart	Plain 3	Ball	Ball	Roll	Hollier 186
Cone	Sel	Unit M.	3	Bevel	Tor.T	Float	Own	Springs	116	34x4	34x4	Wood	Cant	Stewart	Plain 3	Ball	Ball	Roll	Hollier 178
	Fric	Amid	3	Dbl.Ch	Rad.Rd	Dead	Own		112	30x3½	30x3½	Wire	Cant	Stewart	Ball 2	Ball	Ball	Ball	Homer Laughlin D
Plate	Sel	Unit M.	3	Sp.B	Springs	Float	Hess	Springs	118	32x4	32x4	Opt	S-E		Plain 3	Ball	B&R	Roll	Howard
Disk	Sel	Unit M.	3	Sp.B	Springs	Semi-F	Timken	Springs	125½	35x4½	35x4½	Wood*	S-E	Warner	Plain 4	R&P	Roll	Roll	Hudson Super-Six
Disk	Sel	Unit M.	3	Sp.B	Springs	¾ Float	Own	Springs	119	34x4	34x4	Wood*	S-E	VanSicklen	Plain 3	B&R	Ball	Roll	Hupmobile NR
Disk	Sel	Unit M.	3	Sp.B	Springs	¾ Float	Own	Springs	134	35x4½	35x4½	Wood*	S-E	VanSicklen	Plain 3	B&R	Ball	Roll	Hupmobile NU
Disk	Sel	Unit M.	3	Sp.B	Springs	¾ Float	Own	Springs	119	34x4	34x4	Wood*	S-E	VanSicklen	Plain 3	B&R	Ball	Roll	Hupmobile N
Disk	Sel	Unit M.	3	Sp.B	Springs	¾ Float	Own	Springs	119	35x4½	35x4½	Wood*	S-E	VanSicklen	Plain 3	B&R	Ball	Roll	Hupmobile NQ
Cone	Sel	Unit X	3	Bevel	Tor.T	¾ Float	Peru	Tor.T	110	33x4	33x4	Wood	¾ Ell	Stewart	Plain 3	BR&P	B&R	Ball	Inter-State T
Plate	Sel	Unit M.	3	Bevel	Springs	¾ Float	Salisbury	Springs	118	34x4	34x4	Wood	Ell		Plain	Roll	Roll	B&C	Jackson Wolverine 349
Plate	Sel	Unit M.	3	Sp.B	Springs	Semi-F	Own	Springs	116	34x4	34x4	Wood	¾ Ell		Plain 3	Roll	Roll	Roll	Jeffery 472
Plate	Sel	Unit M.	3	Sp.B	Springs	Semi-F	Own	Springs	125	34x4	34x4	Wood	¾ Ell		Plain 3	Roll	Roll	Roll	Jeffery 671

Bevel, Sp.B. **Car Drives Through:** Radius Rods, Rad.Rd; Torsion Tube, Tor.T; Torque Arm, Tor. A. **Rear Axle:** Floating, Float; Semi-Floating, Semi-F; Three-quarter Floating, ¾ Float. **Make of Axle:** Weston-Mott, West. M; Walker-Weiss, W.Weiss. **Rear Springs:** Elliptic, Ell; Three-quarter Elliptic ¾ Ell; Semi-Elliptic, S-E; Cantilever, Cant; Platform, Plat; Transverse Semi-Elliptic, Tr.S-E. **Bearings:** Roller, Roll; Ball and Roller, B&R; Ball and Plain, B&P; Ball, Roller and Plain, BR&P; Cup and Cone, C&C. **Make of Speedometer:** Johns-Manville, Johns-Man. **Fuel Feed:** Stewart Vacuum Tank, Vacuum.

*Wire special equipment. †Wood optional.

Specifications of American Passenger Cars, Including Horsepower,

MAKE AND MODEL	No. of Cylinders	Bore and Stroke, Inches	Piston Displacement, Cubic Inches	Gear Ratio on Direct	Make of Engine	Cylinder Shape	Cam-shaft Drive	Water Circu-lation	LUBRICATION		ELECTRIC SYSTEM		IGNITION			CARBURETION	
									System	Type of Pump	Generator Make	Voltage	System	Make	Control	Make of Carbureter	Fuel Feed
Jones 26-B	6	3½x5½	303.1	5.00-1	Lewis	L	Helical	Ther	Circ-Spl	Gear	Auto-Lite	6	Dual	Auto-Lite	Hand	Stromberg	Vacuum
Jordan 60	6	3½x5½	303.1	4.47-1	Continent.	L	Helical	Cent	Splash-Pres	Piston	Bijur	6	Single	Bosch	Hand	Stromberg	Vacuum
Kent A	4	3¾x5	220.9	4.08-1	Continent.	L	Helical	Ther	Circ-Spl	Piston	Bosch	12	Dual	Bosch	2-Pt	Zenith	Vacuum
King EE	8	3 x5	282.7	4.60-1	Own	L	Chain	Ther	Pressure	Gear	Ward-L	6	Single	At Kent	H&A	Ball	Vacuum
Kissel 6-42	6	3½x5½	340.3	4.58-1	Own	L	Helical	Cent	Non-Splash	Gear	Westinghouse	6	Single	Eisemann	Hand	Stromberg	Vacuum
Kissel Hundred Pt. Six	6	3¼x5	248.9	4.58-1	Own	L	Helical	Cent	Circ-Spl	Piston	Remy	6	Single	Remy	Hand	Stromberg	Vacuum
Kline 6-38F	6	3¼x4½	224.0	4.50-1	Continent.	L	Helical	Cent	Splash-Pres	Piston	Westinghouse	6		Westinghouse	Hand	Rayfield	Vacuum
L																	
Lambert 90	4	4½x5½	297.8		Rutenber	L	Spur		Circ-Spl	Piston	Remy	6	Single	Remy	Hand	Schebler	Vacuum
Lambert 80	6	3¼x4½	224.0		Continent.		Spur	Cent	Circ-Spl	Piston	Remy	6	Single	Remy	Hand	Schebler	Vacuum
Laurel 35	4	3¾x4½	187.7	4.25-1	G.B.&S.	L	Chain	Ther	Splash-Pres	Piston		6	Single	Dixie	Hand	Schebler	Gravity
Lexington 6-O-17	6	3¼x4½	224.0	4.75-1	Continent.	L	Helical	Cent	Splash-Pres	Piston	Westinghouse	6	Single	Conn	Hand	Rayfield	Vacuum
Lexington 6-P	6	4¼x5½	421.0	4.08-1	Continent.	L	Helical	Cent	Splash-Pres	Piston	Westinghouse	6	Double	Westinghouse	H&A	Stromberg	Vacuum
Liberty 10-A	6	3½x4½	207.1	4.75-1	Continent.	L	Helical	Ther	Splash-Pres	Piston	Delco	6	Single	Delco	Hand	Rayfield	Vacuum
Locomobile R-7 38	6	4½x5	425.6	3.85-1	Own	T	Helical	Cent	Splash-Pres	Gear	Westinghouse	6	Dual	Eisemann	Hand	Ball	Pressure
Locomobile M-7 48	6	4½x5½	524.8	3.85-1	Own	T	Helical	Cent	Splash-Pres	Gear	Westinghouse	6	Dual	Eisemann	Hand	Own	Pressure
Luverne 17	6	3¾x5½	347.9	4.00-1	Continent.	L	Chain	Gear	Circ-Spl	Gear	Bosch	12	Double	Bosch	Hand	Schebler	Vacuum
Madison 4	6	3½x5	230.1	4.64-1	Rutenber	L	Helical	Cent	Circ-Spl	Gear	Remy	6	Single	Remy	Hand	Rayfield	Vacuum
Madison	6	3½x5	230.1	4.64-1	Rutenber	L	Helical	Cent	Circ-Spl	Gear	Remy	6	Single	Remy	Hand	Rayfield	Vacuum
Madison	6	3½x5	230.1	4.64-1	Rutenber	L	Helical	Cent	Circ-Spl	Gear	Remy	6	Single	Remy	Hand	Rayfield	Vacuum
Madison 5	6	3½x5	230.1	4.64-1	Rutenber	L	Helical	Cent	Circ-Spl	Gear	Remy	6	Single	Remy	Hand	Rayfield	Vacuum
Madison 7	6	3½x5	230.1	4.64-1	Rutenber	L	Helical	Cent	Circ-Spl	Gear	Remy	6	Single	Remy	Hand	Rayfield	Vacuum
Maibohm A	4	3¾x4	122.7	4.00-1	Own	L	Helical	Ther	Splash-Pres	Piston	Disco	12	Single	At Kent	Atmtc	Zenith	Gravity
Majestic M	8	3x5	282.7				Chain	Ther	Pressure	Gear	Rob Myers	6	Single	At Kent	Hand		Vacuum
Majestic A	8	3½x5	331.8				Helical	Gear	Pressure	Gear	Rob Myers	6	Single	At Kent	Hand		Vacuum
Marion-Handley A 6-40	6	3½x5	230.1	4.42-1	Rutenber	L	Helical	Cent	Splash-Pres	Piston	Westinghouse	6	Single	Westinghouse	Hand	Stromberg	Vacuum
Marion-Handley B 6-60	6	3½x5½	303.1	4.08-1	Continent.	L	Helical	Cent	Splash-Pres	Piston	Westinghouse	6	Single	Westinghouse	Hand	Stromberg	Vacuum
Marmon 34	6	3⅞x5½	339.7	3.69-1	Own	I	Helical	Cent	Pressure	Gear	Bosch	12	Single	Bosch	Hand	Stromberg	Gravity
Maxwell 25	4	3⅛x4½	185.8	3.58-1	Own	L	Helical	Ther	Circ-Spl	Piston	Simms-Huff	6	Dual	At Kent	Hand	K-D	Gravity
McFarlan	6	4½x6	572.5	3.50-1	Teetor	T	Helical	Cent	Splash-Pres	Piston	Westinghouse	6	Double	Bosch	Hand	Stromberg	Vacuum
Mercer 22-73	4	3½x6½	298.2	3.22-1	Own	L	Chain	Cent	Pressure	Gear	U.S.L	12	Single	Bosch	Hand	Corser	Vacuum
Mercer 22-73	4	3½x6½	298.2	3.87-1	Own	L	Chain	Cent	Pressure	Gear	U.S.L	12	Single	Bosch	Hand	Corser	Vacuum
Metz 25	4	3⅞x4	188.7	4.00-1	Own	L	Spur	Ther	Non-Splash	Gear	G&D	6	Single	Dixie	Fixed	A. W. T	Gravity
Mitchell D-40	6	3½x5	248.9	4.41-1	Own	L	Helical	Cent	Circ-Spl	Piston	Splitdorf	6	Single	Conn	Hand	Rayfield	Vacuum
Mitchell C-42	6	3½x5	288.6	4.41-1	Own	L	Helical	Cent	Circ-Spl	Piston	Westinghouse	6	Single	Conn	Hand	Rayfield	Vacuum
Moline-Knight C MK-40	4	3½x5	220.9	4.30-1	Own	I	Chain	Ther	Pressure	Gear	Wagner	6	Single	Conn	Hand	Schebler	Vacuum
Moline-Knight G MK-5J	4	4 x6	301.6	4.00-1	Own	I	Chain	Ther	Pressure	Gear	Wagner	6	Single	Conn	Hand	Schebler	Vacuum
Monitor C&R	4	3¾x4½	187.7	4.00-1	G.B.&S	L	Chain	Ther	Pressure		Heinze	6	Dual	Heinze	Hand	Schebler	Vacuum
Monitor N&O	6	3¼x4½	224.0	4.00-1	Continent.	L	Helical	Cent	Circ-Spl		Heinze	6	Dual	Heinze	Hand	Stromberg	Vacuum
Monroe M-3	4	3 x4½	120.2	4.25-1	Sterling	I	Helical	Ther	Circ-Splash	Piston	Auto-Lite	6	Single	Conn	Hand	Zenith	Gravity
Monroe M-4	4	3½x4½	149.3	4.75-1	Own	I	Helical	Ther	Pressure	Gear	Auto-Lite	6	Single	Conn	Hand	Zenith	Vacuum
Moon 6-43	6	3½x4½	224.0	4.75-1	Continent.	L	Helical	Cent	Splash-Pres	Piston	Delco	6	Single	Delco	Hand	Rayfield	Vacuum
Moon 6-66	6	3½x5½	303.1	4.42-1	Continent.	L	Helical	Cent	Splash-Pres	Piston	Delco	6	Single	Delco	Atmtc	Rayfield	Vacuum
Moore 30 35	4	3¾x4½	187.7	3.70-1	G.B.&S	L	Chain	Ther	Circ-Spl	Gear	Disco	6	Single	Dixie	Hand	Schebler	Vacuum
Murray 70-T	8	3½x5	331.8	4.47-1	Hersh-Sp	L	Helical	Cent	Pressure	Gear		6	Single	Dixie	Hand	Zenith	Vacuum
Napoleon 30	4	3½x5	192.4	4.00-1	Lycoming	L	Helical	Ther	Circ-Spl	Piston	Dyneto	6	Single	Conn	Hand	Carter	Vacuum
National Highway 6	6	3½x5½	303.1	4.58-1	Own	L	Helical	Cent	Splash-Pres	Piston	Westinghouse	6	Single	Dixie	Hand	Rayfield	Vacuum
National Highway 12	12	2¼x4¾	370.1	5.00-1	Own	L	Helical	Cent	Pressure	Gear	Bijur	6	Single	Delco	Hand	Rayfield	Vacuum
Oakland 34	6	2⅞x4¾	177.0	4.50-1	Northway	I	Helical	Cent	Circ-Spl	Piston	Delco	6	Single	Delco	Hand	Marvel	Vacuum
Oakland 50	8	3¼x4½	346.3	4.08-1	Northway	L	Helical	Cent	Splash-Pres	Gear	Delco	6	Single	Delco	H&A	Stromberg	Vacuum
Ogren 102	6	3½x5½	347.9	3.75-1	Continent.	L		Cent	Pressure	Gear	Westinghouse	6	Dual	Bosch	H&F	Rayfield	Vacuum
Oldsmobile 45	8	2¾x4½	246.7	4.92-1		L	Helical	Cent	Pressure	Gear	Delco	6	Single	Delco	H&A	Johnson	Vacuum
Overland 90	4	3¾x5	178.9	3.75-1	Own	L	Helical	Ther	Circ-Spl	Piston	Auto-Lite	6	Single	Conn	Hand	Tillotson	Vacuum
Overland 85	4	4¼x4½	240.5	4.00-1	Own	L	Helical	Ther	Circ-Spl	Gear	Auto-Lite	6	Single	Conn	Hand	Tillotson	Vacuum
Overland 85	6	3¼x4½	224.0	4.60-1	Continent.	L	Helical	Cent	Pressure	Gear	Auto-Lite	6	Single	Conn	Hand	Tillotson	Vacuum
Owen Magnetic M-25	6	3½x5½	303.1	4.50-1	Continent.	L	Helical	Cent	Splash-Pres	Piston	Own	24	Single	Bosch	Hand	Zenith	Vacuum
Owen Magnetic O-36	6	3½x5½	364.5	3.50-1	Buda	L	Helical	Cent*	Splash-Pres	Gear	Own	24	Single	Bosch	Hand	Zenith	Vacuum

ABBREVIATIONS:—Make of Engine: Continental, Continent; Herschell-Spillman, Hersh-Sp; Golden, Belknap & Swartz, G.B.&S.; Massnick-Phipps, Mass-Ph. **Cylinder Shape:** L-Head, L; I-Head, I; T-Head, T. **Camshaft Drive:** Spur Gears, Spur. **Water Circulation:** Centrifugal, Cent; Thermo-syphon, Ther. **Lubrication System:** Splash-Pressure, Splash-Pres; Circulating-Splash, Circ-Spl. **Oil Pump Type:** Impeller, Imp. **Electric System:** Ward Leonard, Ward-L; Gray & Davis, G&D; Allis-Chalmers, Allis-Ch; Leece-Neville, Leece-N. **Ignition System:** Dual-Double, Dual-D. **Ignition Make:** Atwater Kent, At Kent. **Ignition Control:** Hand and Automatic, H&A; Automatic, Atmtc. **Make of Carbureter:** Reichenbach, Reichbch; Longuemare, Longmare. **Clutch Type:** Multiple Disk, Multi-D. **Gearset Type:** Selective, Sel; Planetary, Plan; Friction, Fric. **Gearset Location:** Unit with Motor, Unit M; Unit with Axle, Unit X; Amidship, Amid; Unit with Torque Tube, Unit T. **Final Drive:** Spiral

Carbureters, Crankers, Magnetos, Etc. for 1917—Continued

Clutch Type	TRANSMISSION: GEARSET Type	GEARSET Location	GEARSET Forward Sp'ds	Final Drive	Car Drives Through	Rear Axle Type	Make of Rear Axle	Torque Taken By	RUNNING GEAR: Wheelbase	TIRES Front	TIRES Rear	Wheels	Rear Springs	Make of Speedometer	Crankshaft Bearings Number	BEARINGS: Gearset	BEARINGS: Rear Axle	BEARINGS: Front Wheel	MAKE AND MODEL
Plate	Sel	Unit M	3	Bevel	Springs	Float	Timken	Springs	125	35x4½	35x4½	Wood	S-E		Plain 3	Roll	Roll	Roll	Jones 26-B
Disk	Sel	Unit M	3	Sp.B	Springs	Semi-F	Timken	Springs	127	35x4½	35x4½	Wood	S-E	VanSicklen	Plain 3	Ball	Roll	Roll	Jordan 60
Disk	Sel	Unit M	3	Sp.B	Springs	¾ Float	Timken	Springs	116	32x4	32x4	Opt	¾ Ell		Plain 3	Plain	Plain	Roll	Kent A
Plate	Sel	Unit M	3	Sp.B	Springs	¾ Float	American	Tor.A	120	34x4	34x4	Wood	Cant	Stewart	Plain 3	R&P		Ball	King EE
Disk Cone	Sel Sel	Unit M Unit M	3 3	Sp.B Sp.B	Springs Springs	Float Float	Own Own	Springs Springs	128 117	34x4 32x4	34x4 32x4	Wood Opt	¾ Ell ¾ Ell	Stewart Stewart	Plain 3 Plain 3	Ball Ball	Roll Roll	Roll Roll	Kissel 6-42 Kissel Hundred Pt. Six
Plate	Sel	Unit M	3	Sp.B	Springs	Float	Hess	Springs	120	34x4	34x4	Wood	¾ Ell		Plain 3	Ball	Roll	Ball	Kline 6-38-F
	Fric					Semi-F	Salisbury		115	34x3½	34x3½	Wood	Ell					Ball	Lambert 90
	Fric					Semi-F	Salisbury		112	33x4	33x4	Wood	Ell		Plain 3			Ball	Lambert 80
Disk	Sel	Unit M	3	Bevel	Springs	Float	Peru	Tor.T	112	32x3½	32x3½	Wood*	Cant	Stewart	Plain 3	Ball	Roll	Ball	Laurel 35
Plate Cone	Sel Sel	Unit M Unit M	3 3	Sp.B Sp.B	Springs Springs	¾ Float Float	Hess Timken	Springs Tor.T	116 144	32x4 36x4½	32x4 36x4½	Wood* Wood*	¾ Ell ¾ Ell	Stewart Stewart	Plain 3 Plain 3	B&P Ball	B&R Roll	Ball Roll	Lexington 6-O-17 Lexington 6-P
Plate	Sel	Unit M	3	Sp.B	Springs	Semi-F	Timken	Springs	115	32x4	32x4	Wood	S-E		Plain 3	Ball	Roll	Roll	Liberty 10-A
Disk Disk	Sel Sel	Amid Amid	4 4	Sp.B Sp.B	Rad.Rd Rad.Rd	Float Float	Own Own	Tor.A Tor.A	139 142	36x4½ 37x5	37x5 37x5	Wood Wood	¾ Ell ¾ Ell	Warner Warner	Plain 7 Plain 7	Ball Ball	Ball Ball	Roll Roll	Locomobile R-7 38 Locomobile M-7 48
Disk	Sel	Unit M	3	Sp.B	Springs	Float	Hess	Springs	132	35x4½	35x4½	Wood	S-E		Plain 3	Ball	B&R	Roll	Luverne 17
Disk	Sel	Unit M		Sp.B	Springs	Float	American	Springs	120	34x4	34x4	Wood	¾ Ell	Stewart	Plain 3	Ball	Ball	Ball	Madison 4
Disk	Sel	Unit M	3	Sp.B	Springs	Float	American	Springs	115	34x4	34x4	Wood	¾ Ell		Plain 3	Ball	Ball	Ball	Madison
Disk	Sel	Unit M	3	Sp.B	Springs	Float	American	Springs	124	34x4	34x4	Wood	¾ Ell		Plain 3	Ball	Ball	Ball	Madison
Disk	Sel	Unit M	3	Sp.B	Springs	Float	American	Springs	115	34x4	34x4	Wood	¾ Ell	Stewart	Plain 3	Ball	Ball	Ball	Madison 5
Disk	Sel	Unit M	3	Sp.B	Springs	Float	American	Springs	124	34x4	34x4	Wood	¾ Ell	Stewart	Plain 3	Ball	Ball	Ball	Madison 7
Disk	Sel	Unit M	3	Bevel	Springs	¾ Float	Detroit	Springs	105	30x3½	30x3½	Opt	S-E	Stewart	Plain 2	Ball	Ball	Ball	Maibohm A
Plate Plate	Sel Sel	Unit M Unit M	3 3	Sp.B Sp.B	Springs Springs	¾ Float Float		Springs Springs	125 135	32x4 35x5	32x4 35x5	Wood Wire	S-E S-E	Stewart Stewart	Plain 3 Plain 3	B&R B&R	Roll Ball	Ball Ball	Majestic M Majestic A
Disk Disk	Sel Sel	Unit M Unit M	3 3	Sp.B Sp.B	Springs Springs	¾ Float ¾ Float	Salisbury Salisbury	Springs Springs	120 125	32x4 35x4½	32x4 35x4½	Wood Wood	S-E S-E	Stewart Stewart	Plain 3 Plain 3	B&P Ball	B&R	Ball Ball	Marion-Handley A 6-40 Marion-Handley B 6-60
Cone	Sel	Unit T	3	Sp.B	Tor.T	¾ Float	Own	Tor.T	136	34x4½	34x4½	Wire	Trans	VanSicklen	Plain 4	BR&P	B&R	Roll	Marmon 34
Cone	Sel	Unit M	3	Bevel	Springs	¾ Float	Own	Tor.T	103	30x3½	30x3½	Wood	¾ Ell	Stewart	Plain 2	R&P	Roll	Ball	Maxwell 25
Plate	Sel	Amid	3	Sp.B	Springs	Float	Timken	Tor.A	136	35x5	35x5	Opt	S-E	Warner	Plain 4	Roll	Roll	Roll	McFarlan
Disk Disk	Sel Sel	Amid Amid	4 4	Sp.B Sp.B	Springs Springs	Float Float	Own Own	Springs Springs	115 132	32x4 34x4½	32x4 34x4½	Wood Wood	S-E S-E	Warner Warner	Plain 3 Plain 3	Ball Ball	B&R B&R	Roll Roll	Mercer 22-73 Mercer 22-73
	Fric	Amid	7	S Chain	Rad.Rd		Own	Rad.Rd	108	32x3½	32x3½	Wood	Ell	A.W.T	Plain 3		Roll	Ball	Metz 25
Cone Cone	Sel Sel	Amid Amid	3 3	Sp.B Bevel	Springs Springs	¾ Float Float	Own Own	Tor.T Tor.T	120 127	32x4 34x4	32x4 34x4	Wood Wood	Cant Cant	Stewart Stewart	Plain 3 Plain 3	BR&P BR&P	B&R B&R	Ball Roll	Mitchell D-40 Mitchell C-42
Cone Cone	Sel Sel	Amid Amid	3 3	Sp.B Sp.B	Rad.Rd Rad.Rd	Semi-F ¾ Float	Timken West.M	Rad.Rd Rad.Rd	118 122	34x4 35x4½	34x4 35x4½	Wood Wood	Trans Trans	Stewart Stewart	Plain 3 Plain 3	R&P R&P	Roll Roll	Roll Ball	Moline-Knight C MK-40 Moline-Knight G MK-50
Disk Disk	Sel Sel	Unit M Unit M	3	Bevel Bevel	Springs Springs	Semi-F Semi-F	Russell Russell	Springs Springs	108 115	32x3½ 33x4	32x3½ 33x4	Wood Wood	¾ Ell ¾ Ell		Plain 3 Plain 3	B&R B&R	Roll Roll	Ball Ball	Monitor C&R Monitor N&O
Disk Disk	Sel Sel	Unit M Unit M	3 3	Bevel Sp.B	Springs Tor A	¾ Float Special	West.M Hess	Springs Tor.A	96 115	30x3 32x4	30x3 32x4	Wood Wood	¾ Ell Cant	Stewart Stewart	Plain 2 Plain 2	Ball Ball	Roll Roll	Ball Roll	Monroe M-3 Monroe M-4
Disk Disk	Sel Sel	Unit M Unit M	3 3	Sp.B Sp.B	Springs Springs	Float Semi-F	Hess Timken	Springs Springs	118 125	33x4 35x4½	33x4 35x4½	Wood Wood	S-E S-E	Stewart Stewart	Plain 3 Plain 3	B&P B&P	B&R Roll	Ball Roll	Moon 6-43 Moon 6-66
Disk	Sel	Unit M	3	Sp.B	Tor.A	Float	Peru	Tor.T	106	30x3½	30x3½	Wood	Cant		Plain	Ball	B&P	Ball	Moore 30 35
Plate	Sel	Unit M	3	Sp.B	Springs	Float	Timken	Springs	128	34x4½	34x4½	Opt	¾ Ell	Warner	Plain 3	Roll	Roll	Roll	Murray 70-T
Disk	Sel	Unit M	3	Bevel	Springs	Semi-F		Tor.T	112	31x4	31x4	Wood	Cant		Plain 2	Ball	B&R	Ball	Napoleon 38
Cone Cone	Sel Sel	Unit M Unit M	3 3	Sp.B Sp.B	Springs Springs	Float Float	Columbia Columbia	Tor.R Tor.R	128 128	34x4½ 34x4½	34x4½ 34x4½	Wood Wood	Cant Cant	Warner Warner	Plain 3 Plain 3	Ball Ball	Roll Roll	Roll Roll	National Highway 6 National Highway 12
Cone Cone	Sel Sel	Unit M Unit M	3 3	Bevel Sp.B	Springs Springs	Float Float	West.M West.M	Springs Springs	112 127	32x4 34x4½	32x4 34x4½	Wood Wood	S-E ¾ Ell		Plain 3 Plain 3	BR&P BR&P	Roll Roll	Ball Ball	Oakland 34 Oakland 50
Disk	Sel	Unit M	3	Bevel	Springs	Float	Timken	Springs	132	34x4½	34x4½	Wire	S-E	Stewart	Roll		Roll	Roll	Ogren 102
Cone	Sel	Unit M	3	Sp.B	Springs	Float	West.M	Springs	120	33x4	33x4	Wood	¾ Ell	Stewart	Plain 2	B&R	B&R	Roll	Oldsmobile 45
Cone Cone Cone	Sel Sel Sel	Unit X Unit X Unit X	3 3 3	Bevel Bevel Sp.B	Tor.T Tor.T Tor.T	¾ Float ¾ Float ¾ Float	Own Own Own	Tor.T Tor.T Tor.T	104 112 116	31x4 32x4 32x4	31x4 32x4 32x4	Wire Wood Wood	Cant Cant Cant	Stewart Stewart Stewart	Plain 2 Plain 5 Plain 3	B&R B&R B&R	B&R B&R B&R	Roll Roll Roll	Overland 90 Overland 85 Overland 85
Owen Owen			6 6	Sp.B Sp.B	Springs Tor.A	¾ Float Float	Timken American	Springs Tor.T	125 136	34x4½ 35x5	34x4½ 35x5	Wood Wire	S-E S-E	Warner Warner	Plain 3 Plain 4		Roll Roll		Owen Magnetic M-25 Owen Magnetic O-36

Bevel, Sp.B. **Car Drives Through:** Radius Rods, Rad.Rd; Torsion Tube, Tor.T; Torque Arm. Tor. A. **Rear Axle:** Floating, Float; Semi-Floating, Semi-F; Three-quarter Floating, ¾ Float. **Make of Axle:** Weston-Mott, West.M; Walker-Weiss, W.Weiss. **Rear Springs:** Elliptic, Ell; Three-quarter Elliptic ¾ Ell; Semi-Elliptic, S-E; Cantilever, Cant; Platform, Plat; Transverse Semi-Elliptic, Tr.S-E. **Bearings:** Roller, Roll; Ball and Roller, B&R; Ball and Plain, B&P; Ball, Roller and Plain, BR&P; Cup and Cone, C&C. **Make of Speedometer:** Johns-Manville, Johns-Man. **Fuel Feed:** Stewart Vacuum Tank, Vacuum.

*Wire special equipment. †Wood optional.

Specifications of American Passenger Cars, Including Horsepower,

MAKE AND MODEL	No. of Cylinders	Bore and Stroke, Inches	Piston Displacement, Cubic Inches	Gear Ratio on Direct	Make of Engine	Cylinder Shape	Cam-shaft Drive	Water Circu-lation	LUBRICATION		ELECTRIC SYSTEM		IGNITION			CARBURETION	
									System	Type of Pump	Generator Make	Voltage	System	Make	Control	Make of Carbureter	Fuel Feed
Packard 2-25, 2-35	12	3 x5	424.1	4.36-1	Own	L	Chain	Cent	Pressure	Gear	Bijur	6	Single	Delco	H&A	Own	pressure
Paige Fleetwood 6-38	6	3½x5	230.1	4.41-1	Rutenber	L	Helical	Cent	Splash-Pres	Piston	G&D	6	Single	Remy	Hand	Rayfield	Gravity
Paige Fairfield 6-46	6	3½x5½	303.1	4.35-1	Continent.	L	Helical	Cent	Splash-Pres	Piston	G&D	6	Single	Remy	Hand	Rayfield	Gravity
Partin-Palmer 20	4	3½x4½	138.1	4.00-1	LeRoi	L	Helical	Ther	Circ-Spl	Piston	Allis-Ch	6	Single	Conn	Hand	Schebler	Gravity
Partin-Palmer 32	4	3½x5	192.4	4.00-1	Lycoming	L	Helical	Ther	Circ-Spl	Gear	Disco	6	Single	Conn	Hand	Carter	Vacuum
Paterson 6-45	6	3½x4½	224.0	4.50-1	Continent.	L	Helical	Cent	Splash-Pres	Piston	Delco	6	Dual	Delco	Hand	Stromberg	Vacuum
Pathfinder 2B-TC-2C	12	2½x5	389.5	4.33-1	Weidely	I	Helical	Gear	Pressure	Gear	Delco	6	Duplex	Delco	H&A	Stromberg	Vacuum
Pathfinder 3B	12	2½x5	389.5	4.33-1	Weidely	I	Helical	Cent	Splash-Pres	Gear	Delco	6	Single	Delco	Hand	Stromberg	Gravity
Peerless 56	8	3½x5	331.8	4.45-1	Own	L	Helical	Cent	Pressure	Gear	G&D	6	Single	At Kent	H&A	Ball	Vacuum
Phianna M	4	3⅞x6	287.0	4.00-1	Own	L	Chain	Cent	Pressure	Gear	Ward-L	6	Single	Bosch	Hand	H&N	Vacuum
Pierce-Arrow 38-C-4	6	4 x5½	414.7	3.78-1	Own	T	Helical	Cent	Pressure	Gear	Westinghouse	6	Dual-D	Bosch	Hand	Own	Pressure
Pierce-Arrow 48-B-4	6	4½x5½	524.8	3.53-1	Own	T	Helical	Cent	Pressure	Gear	Westinghouse	6	Dual-D	Bosch	Hand	Own	Pressure
Pierce-Arrow 66-A-4	6	5 x7	824.7	2.88-1	Own	T	Helical	Cent	Pressure	Gear	Westinghouse	6	Dual-D	Bosch	Hand	Own	Pressure
Pilot 6-45	6	3½x5	230.1	4.75-1	Teetor	L	Helical	Cent	Splash-Pres	Gear	Delco	6	Single	Delco	Hand	Zenith	Vacuum
Premier 6-B	6	3⅜x5½	295.3	4.45-1	Own	I	Helical	Cent	Splash-Pres	Gear	Delco	6	Single	Delco	Atmtc	Johnson	Vacuum
Princess 4-36-F	4	3¾x4¼	187.7	4.25-1	G.B.&S	L	Chain	Ther	Circ-Spl	Piston	Disco	6	Single	Splitdorf	Hand	Schebler	Vacuum
Pullman 424-32	4	3¾x4¼	187.7	4.50-1	G.B.&S	L	Chain	Ther	Splash-Pres	Piston	Splitdorf	6	Single	Dixie	Hand	Stromberg	Vacuum
Regal J	4	3½x4⅜	182.8	4.25-1	Own	L	Helical	Ther	Circ-Spl	Piston	Heinze	6	Single	Heinze	Hand	Carter	Vacuum
Regal F	8	3 x4½	254.4	4.00-1	Own	L	Helical	Ther	Pressure	Gear	Dyneto	12	Single		Hand	Johnson	Vacuum
Reo R	4	4¼x4½	240.5	4.30-1	Own	L	Helical	Cent	Circ-Spl	Piston	Remy	6	Single	Remy	Hand	Johnson	Pres-Grav
Reo M	6	3 9/16x5½	306.6	4.30-1	Own	L	Helical	Cent	Circ-Spl	Piston	Remy	6	Single	Remy	Hand	Rayfield	Vacuum
Richmond 6-17	6	3½x5	288.6	4.25-1	Own	L	Helical	Cent	Splash-Pres	Piston	Delco	6	Single	Delco	Hand	Stromberg	Vacuum
Roamer	6	3½x5	230.1	4.42-1	Rutenber	L	Helical	Cent	Splash-Pres	Gear	Bijur	6	Dual	Bosch	Hand	Stromberg	Vacuum
Ross C	8	3½x5	331.8	4.64-1	Hersh-Sp	L	Helical	Cent	Pressure	Gear	Ward-L	6	Single	At Kent	H&A	Zenith	Vacuum
Saxon B-5-R	4	2¾x4	94.0	5.00-1	Continent.	L	Helical	Ther	Circ-Spl	Piston	Wagner	6	Single	At Kent	Atmtc	Reichbch	Gravity
Saxon S-4	6	2¾x4½	175.3	4.75-1	Continent.	L	Helical	Ther	Circ-Spl	Piston	Wagner	6	Single	Remy	Hand	Rayfield	Gravity
Scripps-Booth D	8	2¾x3¾	162.3	4.80-1	Ferro	I	Helical	Ther	Pressure	Gear	Wagner	6	Single	Remy	Atmtc	Zenith	Vacuum
Simplex	6	4¾x6½	563.7		Own	L	Chain	Cent	Pressure	Gear	Bosch	6	Dual	{Bosch / Eisemann}	Hand	Newcomb	Pressure
Singer 17	6	4 x5½	414.7	3.77-1	Hersh-Sp	T	Helical	Cent	Pressure	Gear	Westinghouse	6	Single	Bosch	Hand	Rayfield	Vacuum
Standard E	8	3 x5	282.7	4.45-1	Hersh-Sp	L	Helical	Cent	Pressure	Gear	Westinghouse	6	Single	Westinghouse	Hand	Zenith	Vacuum
Standard F	8	3½x5	331.8	4.45-1	Hersh-Sp	L	Helical	Cent	Pressure	Gear	Apple	6	Single	Dixie	Hand	Zenith	Vacuum
Stearns-Knight SKL4-32	4	3¾x5⅛	248.5	4.50-1	Own	I	Chain	Cent	Splash-Pres	Gear	Westinghouse	12	Single	Remy	Hand	Schebler	Gravity
Stearns-Knight SK8-33	8	3½x5	331.8	4.75-1	Own	I	Chain	Ther	Splash-Pres	Gear	Westinghouse	12	Single	Remy	Hand	Rayfield	Vacuum
Stephens 60-65	6	3½x4½	224.0	4.75-1	Continent.	L	Helical	Cent	Circ-Spl	Piston	Auto-Lite	6	Single	Conn	Hand	Zenith	Vacuum
Studebaker SF4-40	4	3½x5	235.8	4.00-1	Own	L	Helical	Cent	Circ-Spl	Gear	Wagner	6	Single	Remy	Hand	Schebler	Vacuum
Studebaker ED6-50	6	3½x5	353.8	3.70-1	Own	L	Helical	Cent	Circ-Spl	Gear	Wagner	6	Single	Remy	Hand	Schebler	Vacuum
Stutz R	4	4⅜x5½	389.9	3.06-1	Wisconsin	I	Helical	Cent	Pressure	Gear	Remy	8	Single	Bosch	Hand	Stromberg	Pressure
Sun 17	6	3½x5	230.1	4.75-1	Own	L	Helical	Cent	Splash-Pres	Piston	Remy	7	Single	Remy	Hand	Rayfield	Vacuum
Templar 445	4	3⅜x5½	196.8	4.45-1	Own	I	Chain	Cent	Pressure	Gear	Remy	6	Single	Remy	Hand	Zenith	Vacuum
Templar 645	6	3 x5	212.0	4.45-1	Own	I	Chain	Cent	Pressure	Gear	Remy	6	Single	Remy	Hand	Zenith	Vacuum
Velie Biltwell 28	6	3½x4½	224.0	4.33-1	Continent.	L	Helical	Cent	Splash-Pres	Piston	Remy	6	Single	Remy	Atmtc	Stromberg	Vacuum
Velie Biltwell 27	6	3½x5½	303.1	4.08-1	Continent.	L	Helical	Cent	Splash-Pres	Piston	Remy	6	Single	Remy	Atmtc	Stromberg	Vacuum
Westcott S-17	6	3½x5½	303.1	4.45-1	Continent.	L	Helical	Cent	Splash-Pres	Piston	Delco	6	Single	Delco	H&A	Rayfield	Vacuum
White 16 Vaive Four	4	4½x5¾	326.3		Own		Helical	Cent	Pressure	Gear	Leece-N	12	Single	{Eisemann / Bosch}	Hand	Own	Vacuum
Willys-Knight 88-4	4	4½x4½	240.5	4.30-1	Own	I	Chain	Ther	Splash-Pres	Piston	Auto-Lite	6	Single	Conn	Hand	Tillotson	Vacuum
Willys-Knight 88-8	8	3¾x4		4.6 -1	Own	I	Chain	Ther	Pressure		Auto-Lite	6	Single		H&A	Zenith	Vacuum
Willys 88-6	6	3½x5½	303.1	4.00-1	Continent.	L	Helical	Cent	Splash-Pres	Piston	Auto-Lite	6	Single	Conn	Hand	Tillotson	Vacuum
Winton 33	6	3⅞x5½	347.9	4.45-1	Own	L	Chain	Cent	Pressure	Piston	Bijur	6	Single	Bosch	Hand	Rayfield	Vacuum
Winton 48	6	4½x5½	524.8	4.08-1	Own	L	Chain	Cent	Pressure	Piston	Bijur	6	Single	Bosch	Hand	Rayfield	Vacuum
Woods Dual Power 1600	4	2½x3½	68.7	8.25-1	Special	L	Helical	Ther	Circ-Spl	Gear			Single	At Kent	Atmtc	Zephyr	Gravity
Yale	8	3½x4½	276.1	4.45-1	Mass-Ph		Chain	Ther	Circ-Spl		Disco	6	Single	Remy	Hand	Rayfield	Vacuum

ABBREVIATIONS:—Make of Engine: Continental, Continent; Herschell-Spillman, Hersh-Sp; Golden, Belknap & Swartz, G.B.&S.; Massnick-Phipps, Mass-Ph. **Cylinder Shape:** L-Head, L; I-Head, I; T-Head, T. **Camshaft Drive:** Spur Gears, Spur. **Water Circulation:** Centrifugal, Cent; Thermo-syphon, Ther. **Lubrication System:** Splash-Pressure, Splash-Pres; Circulating-Splash, Circ-Spl. **Oil Pump Type:** Impeller, Imp. **Electric System:** Ward Leonard, Ward-L; Gray & Davis, G & D; Allis-Chalmers, Allis-Ch; Leece-Neville, Leece-N. **Ignition System:** Dual-Double, Dual-D. **Ignition Make:** Atwater Kent, At Kent. **Ignition Control:** Hand and Automatic, H&A; Automatic, Atmtc. **Make of Carbureter:** Reichenbach, Reichbch; Longuemare, Longmare. **Clutch Type:** Multiple Disk, Mul-D. **Gearset Type:** Selective, Sel; Planetary, Plan; Friction, Fric. **Gearset Location:** Unit with Motor, Unit M; Unit with Axle, Unit X; Amidship, Amid; Unit with Torque Tube, Unit T. **Final Drive:** Spiral

Carbureters, Crankers, Magnetos, Etc. for 1917—Continued

Clutch Type	TRANSMISSION: GEARSET Type	GEARSET Location	GEARSET Forward Sp'ds	Final Drive	Car Drives Through	Rear Axle Type	Make of Rear Axle	Torque Taken By	RUNNING GEAR: Wheelbase	TIRES Front	TIRES Rear	Wheels	Rear Springs	Make of Speedometer	Crankshaft Bearings Number	BEARINGS: Gearset	BEARINGS: Rear Axle	BEARINGS: Front Wheel	MAKE AND MODEL
Disk	Sel	Unit M	3	Sp.B	Springs	Semi-F	Own	Tor.A	126 135	35x5	35x5	Wood		Waltham	Plain 3	B&R	Ball	Roll	Packard 2-25, 2-35
Disk	Sel	Unit M	3	Sp.B	Tor.T	¾ Float	Salisbury	Tor.T	117	32x4	32x4	Wood	Cant	Stewart	Plain 3	B&R	B&R	Ball	Paige Fleetwood 6-38
Disk	Sel	Unit M	3	Sp.B	Springs	¾ Float	Salisbury	Tor.T	127	35x4½	35x4½	Wood	Cant	Stewart	Plain 3	B&R	B&R	Ball	Paige Fairfield 6-46
Disk	Sel	Unit X	3	Bevel	Tor.T	Float	Durston	Tor.T	96	30x3½	30x3½	Wood	¾ Ell	None	Plain 2	Ball	Ball	Ball	Partin-Palmer 20
Disk	Sel	Unit M	3	Bevel	Springs	Float	Peru	Springs	110	32x3½	32x3½	Wood	¾ Ell	Stewart	Plain 2	Ball	Roll	Ball	Partin-Palmer 32
Cone	Sel	Unit M	3	Sp.B	Springs	Float	Hess	Springs	117	32x4	32x4	Wood	¾ Ell	Stewart	Plain 3	Ball	Roll	Ball	Paterson 6-45
Disk	Sel	Unit M	3	Sp.B	Tor.A	Float	American	Tor.T	130	35x5	35x5	Wire	¾ Ell	Stewart	Plain 3	Roll	Roll	Roll	Pathfinder 2B-TC-2C
Disk	Sel	Unit M	3	Sp.B	Springs	Float	American	Springs	135	35x5	35x5	Wire	S-E	Warner	Plain 3	Roll	Roll	Roll	Pathfinder 3B
Disk	Sel	Unit M	3	Sp.B	Springs	Semi-F	Timken	Springs	125	35x4½	35x4½	Wood	Plat		Plain 3	B&R	Roll	Roll	Peerless 56
Disk	Sel	Amid	4	Sp.B	Rad.Rd	Float		Rad.Rd		32x4½	32x4½	Opt	Cant	Warner	Plain 3	Ball	Roll	B&R	Phianna M
Cone	Sel	Amid	4	Sp.B	Springs	Semi-F	Own	Tor.T	134	36x4½	36x4½	Wood	¾ Ell	Stewart	Plain 7	B&P	B&R	Roll	Pierce-Arrow 38-C-4
Cone	Sel	Amid	4	Sp.B	Springs	Semi-F	Own	Tor.T	142	37x5	37x5	Wood	¾ Ell	Stewart	Plain 7	B&P	B&R	Roll	Pierce-Arrow 48-B-4
Cone	Sel	Amid	4	Sp.B	Springs	Semi-F	Own	Tor.T	147½	38x5½	38x5½	Wood	¾ Ell	Stewart	Plain 7	B&P	B&R	Roll	Pierce-Arrow 66-A-4
Plate	Sel	Unit M	3	Sp.B	Springs	Float	Hess	Tor.T	119	32x4	32x4	Wood	Cant	Stewart	Plain 3	Ball	B&R	Roll	Pilot 6-45
Plate	Sel	Unit M	3	Sp.B	Springs	Semi-F	Timken	Springs	125½	35x4½	35x4½	Wood	S-E	Warner	Plain 3	B&P	Roll	Roll	Premier 6-B
Disk	Sel	Unit M	3	Sp.B	Springs	Float	Own	Springs	108	32x3½	32x3½	Wood	¾ Ell		Plain 3	B&R	B&R	Ball	Princess 4-36-F
Disk	Sel	Unit M	3	Bevel	Springs	Float	Peru	Tor.T	114	31x4	31x4	Wood	Cant	Stewart	Plain 3	Ball	Roll	Roll	Pullman 424-32
Cone	Sel	Unit M	3	Bevel	Tor.T	Float	Peru	Tor.T	108	30x3½	30x3½	Wood	Cant	Stewart	Plain 3	Ball	Roll	Ball	Regal J
Cone	Sel	Unit X	3	Bevel	Rad.Rd	¾ Float	Peru	Tor.T	115	33x4	33x4	Wood	Cant	Stewart	Plain 2	Roll	Roll	Ball	Regal F
Disk	Sel	Amid	3	Sp.B	Springs	Semi-F	Own	Tor.A	115	34x4	34x4	Wood	¾ Ell	Stewart	Plain 3	Roll	Roll	Roll	Reo R
Disk	Sel	Amid	3	Sp.B	Springs	Float	Own	Tor.A	126	34x4½	34x4½	Wood	Cant	Stewart	Plain 3	Roll	Roll	Roll	Reo M
Cone	Sel	Unit M	3	Sp.B	Springs	¾ Float	Own	Springs	124	35x4½	35x4½	Wood	S-E		Plain 3	Ball	Ball	Roll	Richmond 6-17
Plate	Sel	Unit M	3	Sp.B	Springs	¾ Float	Hess	Springs	124	34x4	34x4	Wire	¾ Ell	Warner	Plain 3	Ball	Ball	Ball	Roamer
Disk	Sel	Unit M	3	Sp.B	Springs	¾ Float	American	Tor.T	130	35x4½	35x4½	Wood	¾ Ell		Plain 3	Ball	Ball	Ball	Ross C
Disk	Sel	Unit X	3	Bevel	Tor.T	Semi-F	Timken	Tor.T	96	30x3	30x3	Wood	Cant	Standard	Plain 2	R&P	B&R	Ball	Saxon B-5-R
Disk	Sel	Unit X	3	Sp.B	Tor.T	Semi-F	Timken	Tor.T	112	32x3½	32x3½	Wood	Cant	Johns-Man	Plain 3	R&P	Roll	Roll	Saxon S-4
Disk	Sel	Unit M	3	Sp.B	Springs	¾ Float	Russell	Rad.Rd	120	32x4	32x4	Wire	Cant	Stewart	Plain 2	B&P	B&R	Ball	Scripps-Booth D
Disk	Sel	Unit M	4	Sp.B	Springs	Float	Own	Springs	143½	36x4½	37x5	Wood	S-E		Plain 3	Ball	Ball	Roll	Simplex
Disk	Sel	Unit M	4	Sp.B	Springs	Float	Timken	Springs	136	35x5	35x5	Wire	Cant	Warner	Plain 3	Ball	Roll	Roll	Singer 17
Plate	Sel	Unit M	3	Sp.B	Springs	Semi-F	Timken	Springs		35x4½	35x4½	Wood	S-E	Stewart	Plain 3	B&R	BR&P	Roll	Standard E
Disk	Sel	Unit M	3	Sp.B	Springs	Semi-F	Timken	Springs	127	35x4½	35x4½	Wood	S-E	Stewart	Plain 3	B&R	BR&P	Roll	Standard F
Disk	Sel	Unit M	3	Sp.B	Springs	Semi-F	Own	Springs	119	34x4	34x4	Opt	Cant	Stewart	Plain 3	B&R	B&R	Ball	Stearns-Knight SKL4-32
Disk	Sel	Unit M	3	Sp.B	Springs	Semi-F	Own	Springs	123	35x4½	35x4½	Opt	Cant	Stewart	Plain 3	B&R	B&R	Ball	Stearns-Knight SK8-33
Disk	Sel	Unit M	3	Bevel	Springs	Float	Hess	Springs	115	32x4	32x4	Wood	S-E	Stewart	Plain 3	Ball	Roll	Ball	Stephens 60-65
Cone	Sel	Unit X	3	Bevel	Rad.Rd	Float	Own	Tor.A	112	34x4	34x4	Wood	¾ Ell	Stewart	Plain 3	Roll	Roll	Roll	Studebaker SF4-40
Cone	Sel	Unit X	3	Bevel	Rad.Rd	Float	Own	Tor.A	122	34x4	34x4	Wood	¾ Ell	Stewart	Plain 4	Roll	Roll	Roll	Studebaker ED6-50
Cone	Sel	Unit X	3	Bevel	Tor.T	¾ Float	Own	Rad.Rd	130	34x4½	34x4½	Wire	S-E		Plain 3	Ball	Ball	Roll	Stutz R
Plate	Sel	Unit M	3	Sp.B	Springs	Float	Hess	Springs	116	34x4	34x4	Wood	S-E	Stewart	Plain 3	Ball	B&R	Ball	Sun 17
Plate	Sel	Unit M	3	Sp.B	Springs	Semi-F		Springs	120	32x4	32x4	Opt	Ell		Plain 3	Ball	Roll	Roll	Templar 445
Plate	Sel	Unit M	3	Sp.B	Springs	Semi-F		Springs	120	32x4	32x4	Opt	Ell		Plain 3	Ball	Roll	Roll	Templar 645
Plate	Sel	Unit M	3	Sp.B	Springs	Semi-F	Timken	Springs	115	32x4	32x4	Opt	¾ Ell	Stewart	Plain 3	B&P	Roll	Roll	Velie Biltwell 28
Plate	Sel	Unit M	4	Sp.B	Springs	Semi-F	Timken	Springs	124	35x4½	35x4½	Opt	¾ Ell	Stewart	Plain 3	B&R	Roll	Roll	Velie Biltwell 27
Disk	Sel	Unit M	3	Sp.B	Springs	Semi-F	Timken	Tor.T	125	35x4½	35x4½	Wood	Cant	Warner	Plain 3	B&R	Roll	Roll	Westcott S-17
Plate	Sel	Unit M	4	Sp.B	Springs	Semi-F	Own	Springs	137½	37x5	37x5	Wood	S-E		Plain 3	Ball	Ball	Ball	White 16 Valve Four
Cone	Sel	Unit X	3	Sp.B	Tor.T	Float	Own	Tor.T	121	34x4½	34x4½	Wood	Cant	Stewart	Plain 3	B&R	Roll	Roll	Willys-Knight 88-4
Cone	Sel	Unit A	3	Sp.B	Tor.T	Float	Own	Tor.T	125	34x4½	34x4½	Wood	Cant	Stewart	Plain 2	B&R	Roll	Roll	Willys-Knight 88-8
Cone	Sel	Unit X	3	Sp.B	Tor.T	Float	Own	Tor T	125	35x4½	35x4½	Wood	Cant	Stewart	Plain 3	B&R	Roll	Roll	Willys 88-6
Disk	Sel	Unit M	4	Sp.B	Springs	Float		Tor.T	128	36x4½	36x4½	Wood	¾ Ell		Plain 4	B&R	Roll	Roll	Winton 33
Disk	Sel	Unit M	4	Sp.B	Springs	Float		Tor.T	138	37x5	37x5	Wood	¾ Ell		Plain 4	B&R	Roll	Roll	Winton 48
Mag				B-Worm	Springs	Semi-F	Own	Tor.A	110	34x4	34x4	Wood	Cant		Plain 2		Ball	Roll	Woods Dual Power
Disk	Sel	Unit M	3	Bevel	Springs	Semi-F	Timken	Springs	126			Wood	¾ Ell	Stewart	Plain 2	Ball	Roll	Roll	Yale

Bevel, Sp.B. **Car Drives Through:** Radius Rods, Rad.Rd; Torsion Tube, Tor.T; Torque Arm, Tor. A. **Rear Axle:** Floating, Float; Semi-Floating, Semi-F; Three-quarter Floating, ¾ Float. **Make of Axle:** Weston-Mott, West.M; Walker-Wefss, W.Weiss. **Rear Springs:** Elliptic, Ell; Three-quarter Elliptic ¾ Ell; Semi-Elliptic, S-E; Cantilever, Cant; Platform, Plat; Transverse Semi-Elliptic, Tr.S-E. **Bearings:** Roller, Roll; Ball and Roller, B&R; Ball and Plain, B&P; Ball, Roller and Plain, BR&P; Cup and Cone, C&C. **Make of Speedometer:** Johns-Manville, Johns-Man. **Fuel Feed:** Stewart Vacuum Tank, Vacuum.

*Wire special equipment. †Wood optional.

The Car Digest

A Model-by-Model Resumé of Improvements in 1917 Cars

Grouped According to Number of Cylinders and Arranged Alphabetically

FOURS—Page 82

Aland, Allen, Ams Sterling, Arbenz, Bell, Biddle, Brewster, Briscoe, Brunswick, Buick, Case, Chevrolet, Classic, Crow-Elkhart, Crowther, Dispatch, Dixie Flyer, Dodge, Dort, Drexel, Elcar, Emerson, Empire, Flat, Ford, F.R.P., Hackett, Harroun, Hatfield, Hupmobile, Inter-State, Jeffery, Kent, Lambert, Laurel, Malbohm, Maxwell, Mercer, Metz, Moline-Knight, Monitor, Monroe, Moore, Napoleon, Overland, Partin-Palmer, Phianna, Princess, Pullman, Regal, Reo, Richmond, Saxon, Stearns, Studebaker, Stutz, Templar, White, Willys-Knight, Woods

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Abbott, American, Anderson, Apperson, Auburn, Ben-Hur, Bour-Davis, Buick, Cameron, Chalmers, Chandler, Charter Oak, Chicago, Columbia, Davis, Detroiter, Dorris, Elgin, Empire, Franklin, Geneva, Glide, Grant, Harvard, Haynes, Hollier, Howard, Hudson, Jeffery, Jones, Jordan, Kisselkar, Klinekar, Lambert, Lexington, Liberty, Locomobile, Luverne, Madison, Marmon, Marion-Handley, McFarlan, Mitchell, Monitor, Moon, National, Oakland, Ogren, Overland, Owen Magnetic, Paige, Paterson, Pierce-Arrow, Pilot, Premier, Reo, Richmond, Roamer, Saxon, Simplex, Singer, Stephens, Studebaker, Sun, Templar, Velie, Westcott, Willys, Winton

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Apperson, Cadillac, Chevrolet, Cole, Cunningham, Daniels, Drummond, Hollier, Homer-Laughlin, Jackson, King, Majestic, Murray, Oakland, Oldsmobile, Peerless, Regal, Ross, Scripps-Booth, Standard, Stearns, Yale

TWELVES—Page 102

Austin, Enger, HAL, Haynes, National, Packard, Pathfinder

The Four-Cylinder Cars

Aland

THE Aland is one of three cars announced this season in which a sixteen-valve, four-cylinder motor is used. Hand in hand with the modernity of the sixteen-valve construction is the feature of design of keeping the weight of the car as low as possible throughout. This is gained a good deal by the use of high tensile strength steel. The cylinders are cast in a single block and carried to the crankcase as an integral part. This is an aluminum casting and the cylinder walls are provided with cast iron sleeves, which are pressed into place. An aluminum alloy casting is also used for the cylinder heads and pistons.

Aland Motor Car Co., Detroit, Mich.

Allen

THE latest Allen offerings are found in a convertible sedan and a convertible coupe. The coupe is a completely furnished three-passenger inclosed car. The coupe is upholstered in heavy all-wool gray whip-cord. Interior trimming is of gray broadlace with silk curtains. The interiors are lighted by dome lights placed in the center.

In the sedan there is a space of 6 in. between the rear seat and the back of the top, which affords women occupants an opportunity to lean back comfortably in the seat without crushing their hats, a feature which is readily appreciated. The sedan seats five and the front seats are divided into a roomy passage way. In this model the cushions are covered with gray Spanish Imperial upholstery.

Allen Motor Co., Fostoria, Ohio

Arbenz

THE new Arbenz 25 is a low-priced vehicle for one of its size and the equipment it carries. It has a long stroke motor and has full cantilever suspension in the rear of unique design. It is not much changed from last year.

Arbenz Motor Co., Chillicothe, Ohio

Briscoe

THE 1917 Briscoe is a very new car in practically every detail. The body design is particularly interesting. Following the latest practice, it has a high narrow radiator and a sloping hood and body. There is no transitory curve where the hood joins the body. The slanted windshield gives an added touch to the appearance of speed and power. The motor has a comparatively long stroke, having a stroke-bore ratio which is somewhat greater than the average.

Drive of the generator is unusual, as it is from the rear end of the camshaft through gear connections. The clutch also varies from average practice principally in the fact that it is of the inverted type, that instead of pulling back from the motor to release, it is shoved toward the cylinders. It is the leather-faced cone type. In the clover-leaf model there is an upholstered door between the divided front seats which closes the rear compartment off or opens the aisleway as one wishes.

Briscoe Motor Corp., Jackson, Mich.

Brewster

ALTHOUGH Brewster & Co. has done high-class coach work since 1810 and has built some of the finest custom motor car bodies in recent years, it enters for the first time into the construction of a complete car. It can well be imagined that these cars are of high price, the lowest-priced model selling for $2200 and the highest for $2300. The very carefully constructed chassis embodies a four-cylinder Knight motor with a 4-in. bore and a 5½-in. stroke, Zenith carbureter, Bosch ignition and other standard makes of parts of a like caliber. An interesting feature of the construction is the spring suspension of huge cantilevers. Custom-built bodies of all types are offered.

Brewster & Co., New York

Brown

IN introducing its new product of passenger cars, the Brown makers do not claim them to be creations of a corps of engineers but instead that the machines are made up of assembled parts constructed by capable and well known manufacturers in the motor car line. In matters

of equipment the motor is a stock model LeRoy. The electrical system includes an Atwater-Kent distributer fed from a U. S. L. storage battery which is in turn fed from an Allis-Chalmers motor generator. Carburetion is supplied through a Kingston float feed instrument, the rear axles are Walker & Weiss make with Hyatt bearings and Batavia or U. S. tires are offered as optional.

Brown Carriage Co., Cincinnati, Ohio

Buick

AFTER a few seasons of sixes only, Buick again has gone back to the light-weight four. This new car follows characteristic Buick designs throughout with perhaps more alterations in the motor than elsewhere although that unit is a valve-in-the-head type as are all power plants of this make.

In its general lines, specially the radiator, the new car is typically Buick. It has a wheelbase of 106 in. and there is plenty of room for five passengers.

Specifications of interest are pump cooling, Marvel carbureter in conjunction with rear tank and Stewart vacuum feed, Delco starting, lighting and ignition, cone clutch, three-speed gearset in unit with the engine, drive shaft inclosed within a torsion tube, three-quarter floating axle, semi-elliptic springs both front and rear and 31 by 4-in. non-skid tires all around. This is the first Buick motor in which the cylinder head is detachable as a unit with the valves. In the design of the cylinder head, special provision has been made for proper cooling of the valves, the water passages surrounding the pockets being of good size.

Buick Motor Co., Flint, Mich.

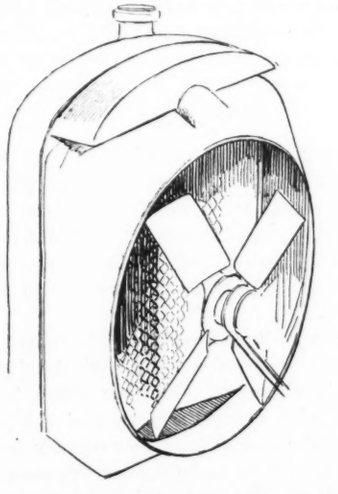
Case

THE new Case, which makes its debut at the New York show, has several changes designed to add to the mechanical efficiency and alterations to increase the comfort and convenience of the passengers, with body changes which make the car a more beautiful assembly.

This year's motor has been simplified by elimination of the cross shaft used for generator drive. The camshaft chain drive of a year ago is replaced by helical timing gears of special material which, in connection with roller push rods and inclosed valves, make for noiseless operation. Changes of note in the chassis are found in the rear axle and cooling system. The former is now a three-quarter floating type and the radiator, which last season was cellular, is now a vertical tube design, manufactured in the Case shop. The two-blade fan has been replaced by one with six blades.

A change appears in the starting, lighting and ignition system. An Auto-Light generator has been installed and ignition is supplied by a Connecticut distributer fed by a Willard storage battery. Body changes make for more artistic lines, the characteristic Case shape being maintained.

J. I. Case T. M. Co., Racine, Wis.



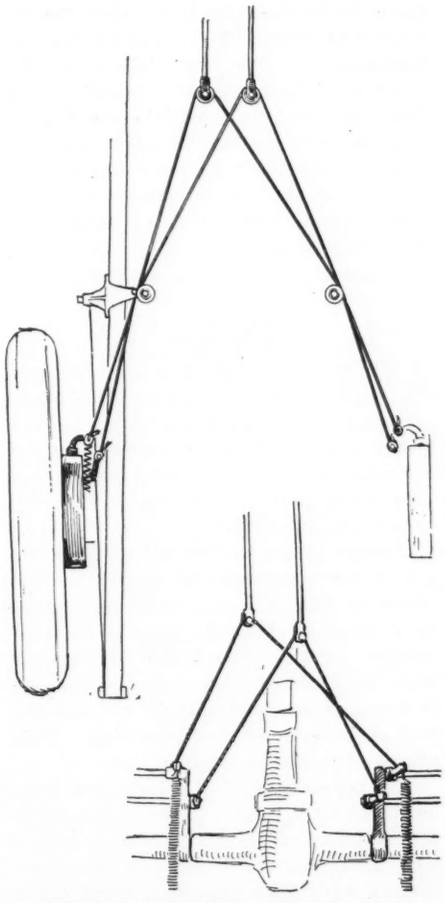
Sheet metal shell on Bour-Davis to concentrate cooling effect of fan

Chevrolet

THE new Chevrolet 4-90 is an improvement over its predecessor in several respects. The car is better looking and more comfortable. The body has been changed so that it is more streamline and a door is now carried on the driver's side. Last year there were but three doors.

Tires have been increased from 30 by 3 to 30 by 3½ and Goodyear non-skids instead of plain tread are fitted. A sight-feed oiler and indicator has been placed on the cowl and the horn button has been attached to the steering post, instead of on the body side. Three-quarter elliptics are used at the front.

Chevrolet Motor Car Co., Flint, Mich.



Two brake connections. The one above shows that of the Detroiter and the one below is of the Maibohm

Classic

THE Classic is a newcomer selling for $895. The body is a roomy seven-passenger type of advance 1917 design and is mounted on a 114-in. wheelbase chassis. There are flush doors with concealed hinges and flush type upholstery without heading. The car has an unusually complete complement of equipment in accessories for one in this price.

Classic Motor Car Corp., Chicago

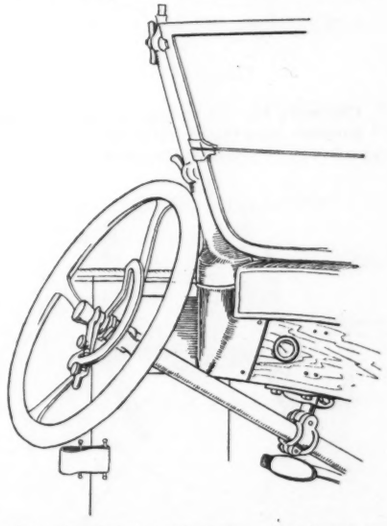
Crow-Elkhart

THE two Crow models, one a five-passenger touring and the other a three-passenger cloverleaf, are considerably different in exterior appearance. The body with the most striking appearance is the cloverleaf roadster which has a boat-shaped rear, a V radiator, and a distinct line from the radiator to the cowl. Wire wheels are standard equipment on this model. Both bodies contain more roominess than was found in previous cars offered by this company. Chassis principles of the car remain fundamentally the same as they have been for the past eight years.

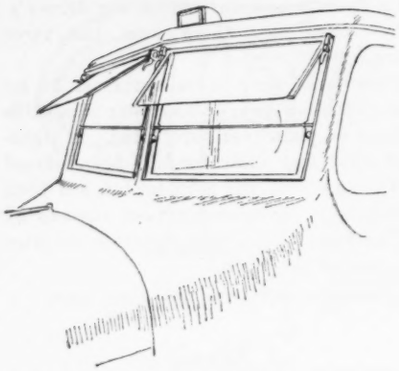
Crow Motor Car Co., Elkhart, Ind.

Crowther

CHARLES E. DURYEA, pioneer motor car builder, has designed another car, which is being marketed under the Crow-



The Standard eight uses a reinforcing plate to support the windshield. There also is a special clamp to make the steering column more rigid



The Paige touring sedan has a novel windshield. It is in two parts, and half of it may be opened while the other half is closed

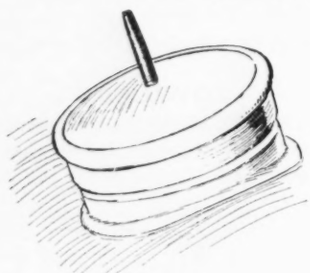
ther name. Its features are unusual chassis simplicity and a gearset which operates within the rear wheels, engagement of the gears being brought about by swinging the jack shaft in swing bearings and bringing different-sized gears into play. Because of this jackshaft construction, the rear axle is naturally a dead axle. The jackshaft is supported on side members extending from the rear axle to the frame which also serve to take up the torque. The car has no differential.

Crowther Motors Co., Rochester, N. Y.

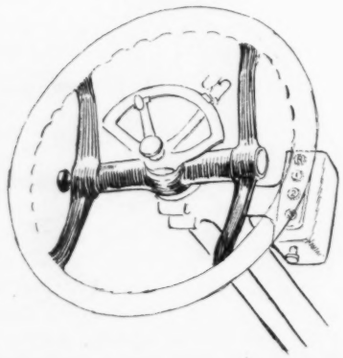
Cummins-Monitor

THIS concern has been assembling and manufacturing two models for the last year and they will be continued with slight changes. They are the four-cylinder priced at $795 and the six-cylinder priced at $995.

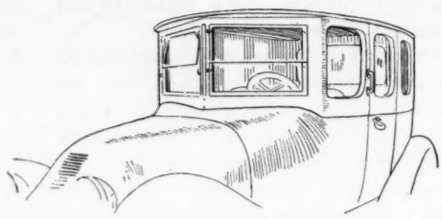
Cummins-Monitor Co., Columbus, Ohio

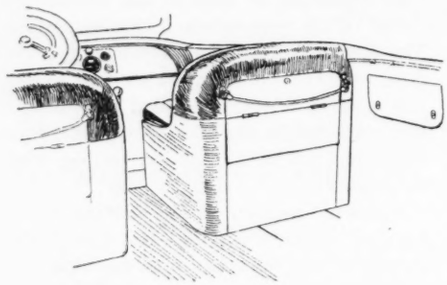


Chalmers has a new type of filler for the gasoline tank which has an air spout that prevents slopping



Premier employs a tilting steering wheel which gives easy entrance for the driver





Franklin sedan, shown above, has a windshield that is somewhat like the Paige, shown on the left. Below is shown the spacious aisle between the front seats of the National. Note how the upholstery comes far over the backs of the front seats

Dixie

A FOUR-PASSENGER roadster with cloverleaf seating arrangement is the newest thing in Dixie body styles. A little nicety in the equipment is an auxiliary cover of packer cloth which fastens with glove fasteners to the bows when the top is lowered, completely concealing the rear compartment. The motor is a four-cylinder, L-head, Lycoming of conventional design. Rear axle in the Dixie is a floating type, drive to the rear wheels transmitted from the drive-shaft by a jaw clutch. Dixie was one of the first to embody a flexible disk clutch, and this feature is retained in the 1917 chassis.

Dixie Motor Car Co., Louisville, Ky.

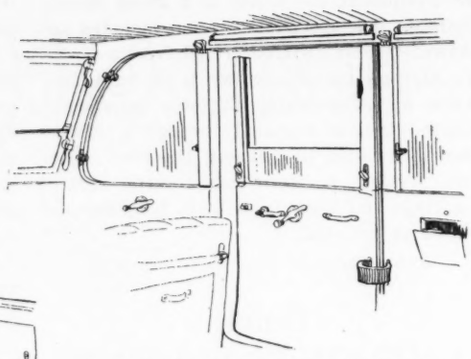
Dodge

ALTHOUGH Dodge does not announce yearly models, a number of changes have appeared in these cars within the last 2 or 3 months. Notable among these are the addition of a convertible sedan of a type which permits lowering of the windows for summer driving.

Changes in mechanical parts of the car are in the installation of a multiple-disk clutch in place of a cone clutch and spiral-bevel gears in the rear axle in place of straight bevels. The brake drums have been increased in size. Another change is found in single wiring in the starting system instead of double wiring. This affects the starting system only.

The appearance of the body has been improved by a height increase of 2 in. in the radiator and hood. There is now a mud apron on the front and the front fenders have been improved, these being stamped out of one piece of sheet steel.

Dodge Bros., Detroit, Mich.



The interior of the Paige sedan bespeaks luxury. Note how the glass in the front window conforms to the bias windshield

Dort

THERE have been no changes in the Dort models which were announced for 1916 production. It is not the intention of this company to bring out yearly models, but simply to add from time to time such changes as are considered advisable or to the best interest of its customers. The car is a conventional four-cylinder model of light weight, and has economy as one of its big talking points.

In bodies there are to be found three new styles. These are the sedan, the sedanet and the fleur-de-lys roadster. The inclosed models are striking in design, having rain-vision windshields, divided front seats and a complete closed-car equipment.

Dort Motor Car Co., Flint, Mich.

Drexel

DREXEL is the fourth manufacturer to announce a sixteen-valve four-cylinder car. The motor, which is the design of A. J. Farmer, formerly of General Motors, has a 3½-in. bore and 5-in. stroke with turning possibilities of 3400 r.p.m., so it is claimed. In the equipment is found Stromberg carbureter, Bosch magneto, Bijur two-unit starting and lighting system, floating axles, and a 112-in. wheelbase. The selling price is $855.

Drexel Motor Car Co., Chicago

Elcar

THE Elcar for the coming season will be furnished in five-passenger touring car, four-passenger touring roadster and a two-passenged roadster designated as models D, E and F, all on the same chassis. The chassis is quite different from that of 1916.

The wheelbase has been increased to 115 inches and the design of the frame itself is different. The cone clutch is replaced with a dry-disk type and the position of the gearshift and emergency brake levers is such as to be more convenient for the driver. The new spring suspension is semi-elliptic front and rear and spiral bevel

gears are used and a new floating axle with roller bearings at each end of the wheel hubs.

Elkhart Carriage and Motor Car Co., Elkhart, Ind.

Emerson

THE Emerson four is a completely equipped five-passenger car selling at $395. Features probably never before found in a car of such low price are the electric lighting equipment, stream line body with double cowl, slanting windshield and a 110-in. wheelbase. The body lines of the car conform with modern practice.

Emerson Motors Co., Inc., New York, N. Y.

Fiat

CHARACTERIZED by an usually large bore and long stroke, the four-cylinder Fiat has a displacement that is probably the largest of all American fours and only exceeded by two other cars, those having six cylinders. The bore is 5⅛ and the stroke 6¾. This gives a displacement of 557 cu. in. and the high power makes possible a high-gear ratio of 2¾ to 1 on touring models and 3 to 1 on the limousine. The Fiat is a strictly high-priced car, the touring car selling for $5500 and the limousine for $6500. Naturally the options offered are numerous.

F-I-A-T CO., Poughkeepsie, N. Y.

Ford

THE Ford changes of 1917 production outside of the startling announcement of price decrease which is well known, is in the external appearance. These changes include the fitting of an entirely new radiator of black enamel with rounded corners instead of the sharp angles that it used previously. This radiator has a smaller water capacity and for this reason is thinner than the previous one and this is compensated by the fact that the fan operates in a bell shaped shell attached to the rear of the radiator which is made of sheet metal. This concentrates the cooling effect of the fan. There is a new sloping hood that eliminates any break where it joins the body and crown fenders which conform to the curve of the wheels in most modern fashion are installed front and rear.

A minor change under the hood is the fitting of an electric horn mounted on the right rear side of the cylinders between them and the steering column. The horn is of the vibrator type and is arranged to operate from the current of the flywheel magneto and the button is mounted on the steering column just under the wheel.

The new radiator shell is a two-piece stamping, one the shell proper and the other the top portion that bears the Ford name plate stamped on it. The familiar Ford filler cap and radiator spout of brass protrude through the top of the shell. Now that the radiator is enameled, there is very little brass about the car, only the filler and hub caps being finished in the color of this metal.

Ford Motor Car Co., Detroit, Mich.

F. R. P.

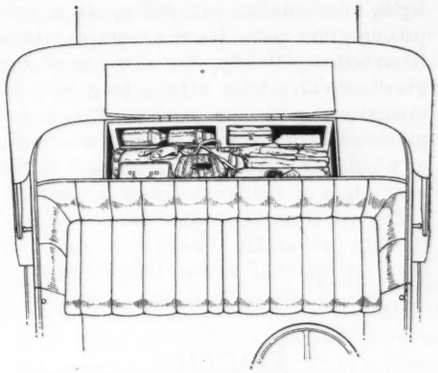
THE model 45 F. R. P. series A, B and C cars are being continued with some changes. Noticeable among these changes is the cone clutch which is being abandoned in favor of a special Hele-Shaw clutch and the motor which is being changed from eight valves to sixteen. There is also being added a model 35 which will be furnished in three series, a two-passenger, a five-passenger and a close-coupled four-passenger job. The same construction throughout will be used in this model except for the motor size.

Finley Robertson Porter Co., Inc., Port Jefferson Station, L. I., N. Y.

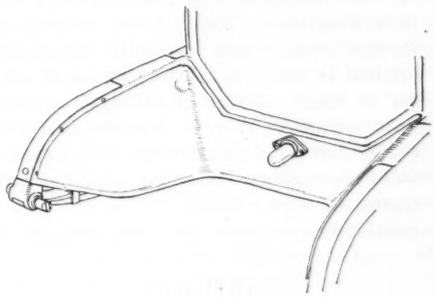
Ghent

THE new Ghent four-cylinder car is featured by a five-passenger, double cowl body of the latest improved type placed on a 120-in. wheelbase chassis and selling for $750. The general construction of this newcomer is conventional throughout, the most noticeable innovation being the use of Parker hydraulic pressed steel wheels made under the Hugo C. Gibson patent. The lines of the body are particularly distinctive.

Ghent Motor Co., Chicago



Carrying compartment which is a feature in King Foursome



Apron in front of the Locomobile to prevent splashing

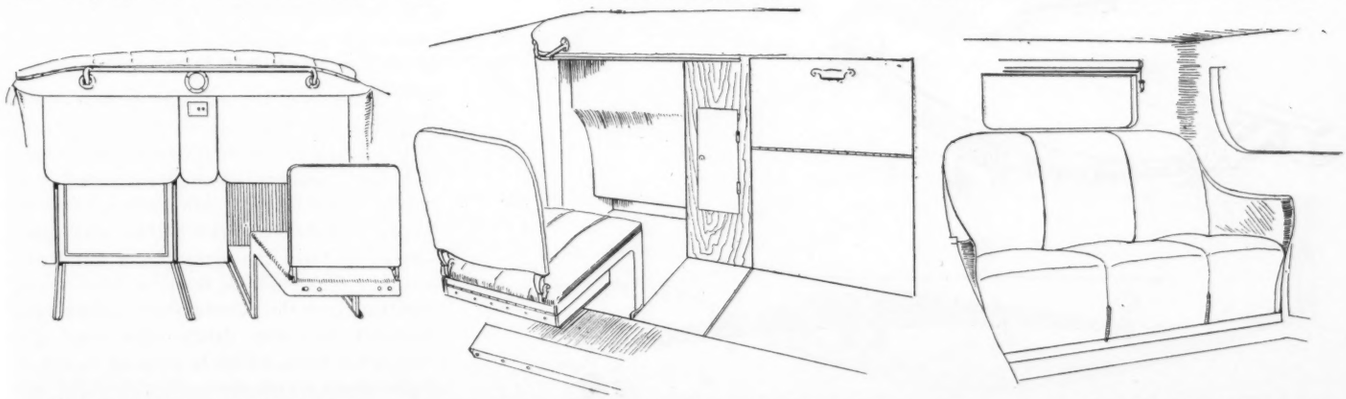
Hackett

THE Hackett made its debut but a few months ago, the first description appearing in the August 31, 1916, issue of MOTOR AGE. The originality of the body puts it in a class by itself as far as appearance is concerned. There is a straight line running from the top corners of the radiator all the way back. The effect is accentuated by the use of a narrow deck extending all around the rim of the body and also forming a double cowl on the back of the rear seat. The windshield is tilted and there are large louvres in the hood which are set at the same angle. There is a five-passenger touring, a runabout and a cabriolet.

Hackett Motor Car Co., Jackson, Mich.

Harroun

RAY Harroun's new car which bears his name was first announced in the December 21 issue of MOTOR AGE. It is a



The two views at the left show how the Locomobile and Standard eight take care of the auxiliary seats. They fold into the backs of the front seats. At the right is shown the deep upholstery of the Pierce-Arrow

light four-cylinder car selling at a surprisingly low price for the features which it embodies. Briefly, the motor is of the overhead-valve type with a long bore in comparison with the stroke. The motor propels a very low hung chassis, the frame of which flares from a narrow front to the very edges of the break drums in the rear.

The oil from the motor crankcase continually circulates through a radiator, thus maintaining a low temperature.

Harroun Motors Corp., Wayne, Mich.

Harvard

THE Harvard roadster announced late in the fall has a 44-inch tread with a 100-inch wheelbase. To meet the demand of foreign trade where practically all of the product is sold. A Sterling model 20 motor is used. Atwater-Kent ignition has been adopted with a Wagner two-unit starting and lighting system. This supersedes a single-unit starting and lighting system of high voltage.

Harvard-Pioneer Motor Car Corp., Troy, N. Y.

Hatfield

THE Hatfield is built in three models, a three-passenger roadster, a suburban car and a speedster. In the suburban car, the makers have touched a new field. It is built with very low sides and express top and a rear seat which may be removed. The claim is that this model is rugged enough to go to mill and handsome enough to go to meeting. It is designed as the ideal farmer's car.

Cortland Cart & Carriage Co., Sidney, Ohio

Hupmobile

FOR 1917 Hupp is continuing the model N which is built with the same bodies as before, namely: Five-passenger touring, five-pasenger convertible, five-passenger sedan, two-passenger roadster, two-passenger convertible coupe and seven-passenger touring.

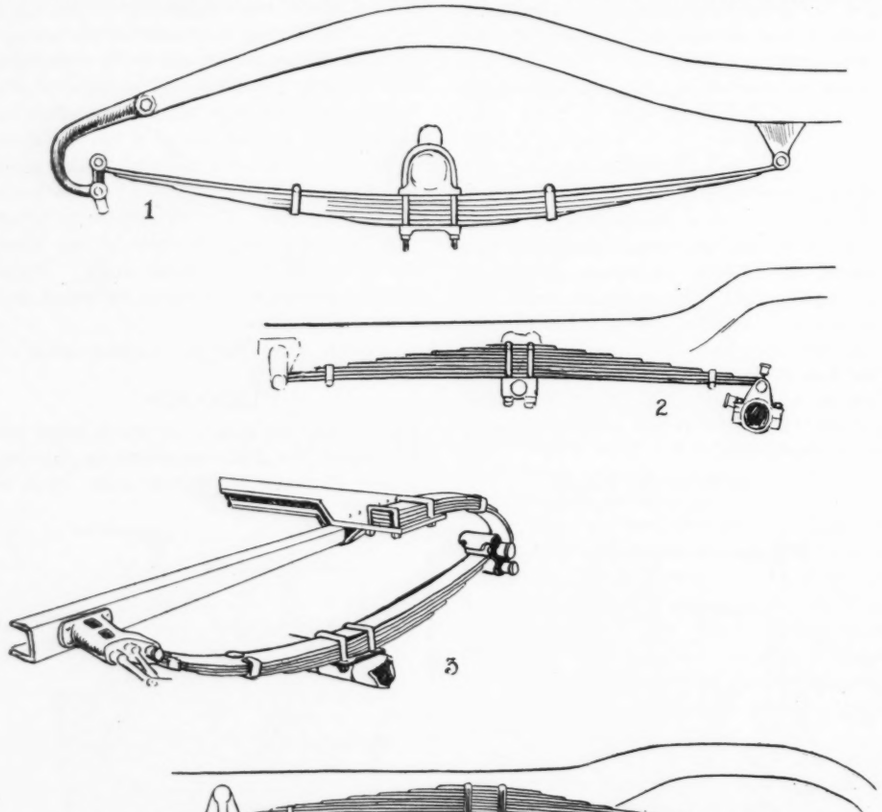
The changes in the model N from those furnished last year are all in the nature of refinements, looking to comfort and ease of operation of the owner. Neverleak material has been substituted for mohair for the summer top and curtains. The Firestone type of rim has been adopted.

Hupp Motor Car Co., Detroit, Mich.

Inter-State

ALTHOUGH the standard touring car and roadster of the Inter-State offerings remain unchanged after 3 years of standardized manufacturing, four new body designs are offered for 1917 in the form of a divided front seat touring car, a Four-Leaf Clover four-passenger roadster, a Springfield-type ouring sedan, and a panel body delivery wagon of 850-lbs. carrying capacity. This makes the Inter-State product total six body designs with no discontinuation of any 1916 models. All of the models for 1917 show a more intensified adherence to perfection of details rather than any radical changes in design or construction. Particular emphasis has been laid upon comfortable seating arrangement and to arrive at this end the Inter-State company is featuring individual attention to hand-tailored upholstery in its medium-priced cars.

Inter-State Motor Co., Muncie, Ind.



Four spring arrangements. 1, Haynes semi-elliptic; 2, Overland cantilever; 3, Maxwell three-quarter-elliptic, and 4, Buick cantilever

Jeffery

ALTHOUGH the prices of the Jeffery six have been increased, the fours remain for the present the same. These appear in three models, a seven-passenger touring a roadster and a seven-passenger sedan. The roll-edge feature of the body construction is new this year.

The Jeffery radiator is high and narrow, and the line from the top corner of the radiator to the rear seat is very nearly horizontal with the ground, giving the car a rakish straight-line appearance. Further enhancing this is the fact that the new bodies are considerably lower than they were in 1916 production.

In the equipment of this car is found the following: Rain vision windshield, tonneau foot rests, extra rim and carrier, electric instrument board on which are mounted speedometer, ammeter, oil-sight feed, ignition and lighting switch, and carbureter air adjustment. The headlights are equipped with small bulbs for dimming lights.

Nash Motors Co., Kenosha, Wis.

Kent

THE Kent is a newcomer in the passenger car field and is assembled from standard parts. The body lines conform with most recent accepted practice with a high, narrow radiator and unbroken lines from the top corner of the radiator to the rear of the car. The body is low hung and embodies the popular rear-compartment cowl. With a slanting windshield, a rakishly tilted wheel and a top which is horizontal when closed, the car has a massive, racy appearance.

Kent Motors Corp., Newark, N. J.

Lambert

GOING over the mechanical features of the new Lambert we find the friction drive which has characterized the car bearing the Lambert name for a number of years. This drive is conventional for this type, a patented, removable disk plate operating from the motor drive shaft onto another disk with a friction fiber facing which drives the countershaft. This countershaft in turn drives the rear axle through a chain which is inclosed in a dust-tight sheet metal case. Lightweight construction is adhered to throughout. The front springs are semi-elliptic and the rear

full-elliptic. An interesting feature of the motor is the cross-mounting of the centrifugal water pump and the dynamo directly behind the radiator driven by one shaft which is internal-worm-driven off of the crankshaft.

Buckeye Mfg. Co., Anderson, Ind.

Laurel

THE 1917 Laurel line will include two entirely new body designs, a five-passenger, double-cowl and a four-passenger cloverleaf roadster. Except for lengthening the wheelbase from 112 to 115 inches, the adoption of adjustable chain drive for the magneto and starter and the installation of a two-unit starting and lighting system, together with Connecticut distributer or a Dixie magneto at the option of the buyer, few changes have been made in the chassis.

Both exterior and interior finish of the four-passenger cloverleaf roadster give this body an exceptionally good appearance. The front seats are full size with ample aisle space and there is plenty of leg room for two passengers in the rear seat. Roominess marks the five-passenger, double-cowl touring body, the rear seat being 48 inches wide. Crown fenders with wide running boards will be standard features on both models.

Laurel Motor Car Co., Richmond, Ind.

Lozier

MUCH has been done to make the Lozier four as light as possible. It is made with five- and seven-passenger body and 120-in. wheelbase. It has a bore of 4¼ and a stroke of 6½ in., the motor being of a L-head type with removable cylinder head. The frame kicks up in the rear to allow a lower center of gravity and is made narrow at the front to give a turning radius of 36 ft., 6 in..

Lozier Motor Co., Detroit, Mich.

Maibohm

IN designing this newcomer, the engineers have aimed to produce a roadster, at a thoroughly low price, which gives a speedy appearance and performance and comfortable seating. It is a low built car with deep seats having extra heavy upholstery so that the passengers sit well within the body despite the rakish exterior. For the convenience of the driver, a wide range of adjustment is provided on the pedals and the gearshift and brake levers are bent back so as to come within easy reach.

Maibohm Motors Co., Racine, Wis.

Majestic

THE new Majestic offerings are a 125-in. wheelbase model with a 3 by 5 motor, and a 135-inch wheelbase model with a 3¼ by 5-in. motor. The appearance of the car is unusually distinctive, largely because of the rounded radiator and specially designed headlights. A tilted windshield and double cowl are employed.

There is a mahogany-paneled compartment, the interior of which is large enough for several lunch boxes, dusters and other articles. The door lifts up with lock hinges forming a table so that the lunch may be comfortably eaten in the car. At the right is a compartment fitted with a vacuum bottle and cigar lighter. At the left there is a compartment containing a vacuum ice box. The tonneau also includes a woman's toilet set and a cushion foot rest.

Majestic Motor Co., New York

Maxwell

BACK in June, 1916, Maxwell startled the industry with an announcement of a reduction on all models for the 1917 product. Since that time, however, the price of material has so greatly increased that this large producer has again been obliged to step the prices up. The new figures are: $620 for the roadster, and $635 for the touring car.

At this particular season an unusually large share of Maxwell production is going into the cabriolets, town cars and sedans. These small inclosed models are artistically furnished in the interior and the lines of the exterior give the car the appearance of being of considerably larger size than it really is.

The 1917 Maxwell is not changed. The management believes the car to be standardized and for the present will not alter the product in any way. The chassis has a 102-in. wheelbase and is powered with the familiar block-cast cylinder type of motor with 3⅝-in. bore and 4½-in. stroke.

Maxwell Motor Co., Detroit, Mich.

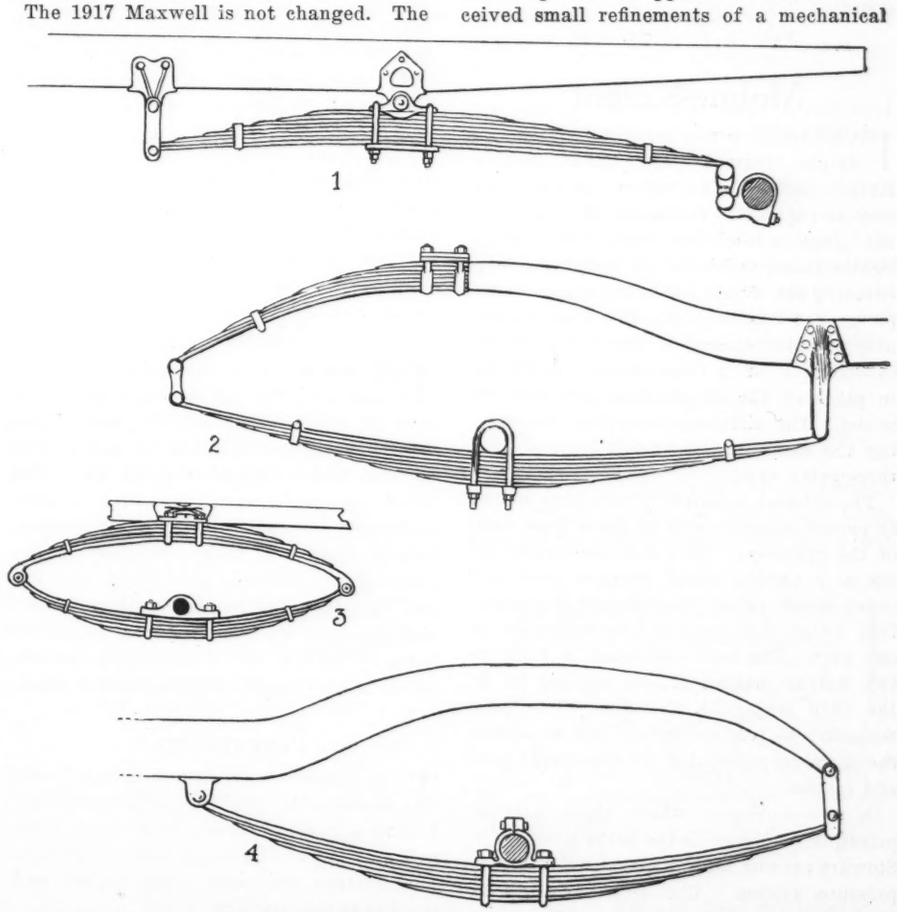
Mercer

LITTLE needs to be said of the mechanical ability of the Mercer 22-73, which is a continuation of the 1916 model 22-72. Accessibility stands out all over the powerplant of this car. It is a pleasant surprise for one who has never done it before to lift the hood and view the unusually clean exterior. Of course, the Mercer is powerful and fast. Those are two reasons for the form in which it is built. Another thing one likes to look at is the Mercer body. It is long and low and of thoroughly harmonious racing lines. As a matter of mechanical performance the Mercer has shown its mettle on the speedway and road. Power comes from a long-stroke, extreme high-speed type of motor capable of 3800 r.p.m.

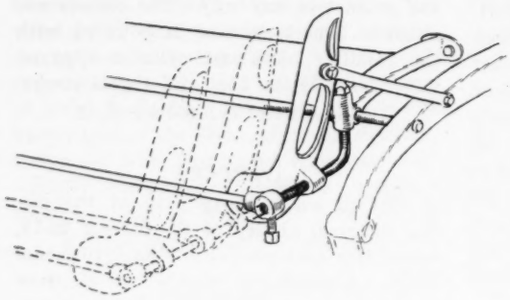
Mercer Automobile Co., Trenton, N. J.

Metz

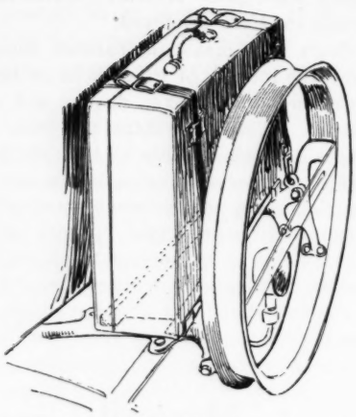
THE new Metz, although reduced in price is a manifestly improved car. The models contain no radical changes but have been improved in appearance and have received small refinements of a mechanical



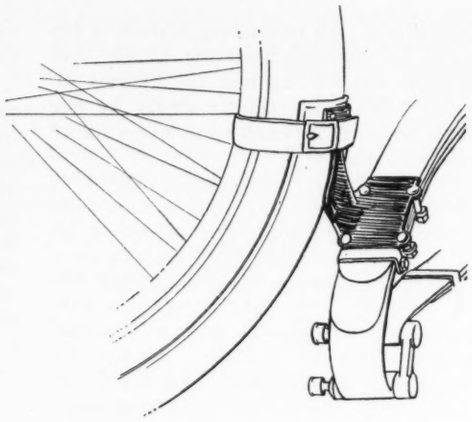
Four spring arrangements. 1, Grant six cantilever; 2, Lexington three-quarter-elliptic; 3, Briscoe full-elliptic, and 4, Oakland semi-elliptic



Auburn employs a tire-carrying bracket with one attachment to handle a single tive as standard equipment. Additional attachments can be obtained if desired



Bour-Davis has a combined trunk and tire carrier that comes as standard equipment. Note that the bracket that holds the tire also holds the trunk



Roamer has a special bracket that acts both as a spring clamp and a holder for the spare wheel. The method of attachment is shown above

nature. The friction form of transmission is retained without material change. In regard to the mechanical changes, the reciprocating parts of the motor have been lightened and that is the only change of importance that has been made. There is a new ventilating hood and a metal-covered windshield, black enameled, in place of the leather-covered board of the previous model. The steering columns brackets have been strengthened and a light has been placed on the instrument board. Pockets are now a part of the rear seat doors.

Metz Co., Waltham, Mass.

Moline-Knight

INCREASED power with a reduction in weight features the latest Moline-Knight model. The motor has the same bore and stroke as the model 50, which was the large car of last year, but a much lighter frame and body has been fitted thus reducing the weight so that the same motor power has less to pull. The most noticeable exterior change in the motor is the substitution of a Connecticut distributer in place of the magneto in the previous model. The silent-chain system for driving the cams is a two-point instead of a three-point type.

The exhaust manifold is now constructed to permit separate exit of gases from each of the cylinders. This is accomplished by use of a casting which ports to each cylinder which takes the place of the manifold which took care of two cylinders in one port. The new crankcase is built in two halves instead of one casting as in the 1916 model 50, therefore it is only necessary to remove the oil pan to permit the complete removal of all connecting rods and pistons.

A new accessory which alters another principle of design is the installation of a Stewart vacuum tank in place of the former pressure system. The new body marks Moline's acceptance of the double cowl.

Moline Automobile Co., East Moline, Ill.

Monroe

LESS than two months ago, Monroe announced its entry into the touring car field with a five-passenger, four-cylinder model with a number of new features. The new car is roomy with its 115-in. wheelbase and it embraces the latest in construction ideas especially in the frame which is the deep section design in which the mud aprons and running boards are a part of the structure.

Everything about the car is in line with the latest tendencies. The overhead valve motor, detachable cylinder head, big valves, dry plate clutch, slanting windshield and cantilever springs are exemplifications of this.

The familiar Monroe roadster is continued at an increased price and greatly improved. Chief among the changes is the adoption of an entirely new motor with a smaller bore and longer stroke than the previous model.

Monroe Motor Car Co., Pontiac, Mich.

Moore 30

THE Moore 30 is continued from last year with few changes and after January 15, the Moore Motor Co., which previously built this car will be taken over by the Moore Motor Vehicle Co. The Moore comes in one type only, a five-passenger touring car. It uses a Golden, Belnap & Swartz motor, Schebler carbureter, Dixie magneto and Disco starting and lighting. The gearset is a Grant Lees, and the rear axle is a Peru. Goodyear tires, 30 by 3½, are standard equipment.

Moore Motor Vehicle Co., Minneapolis, Minn.

Napoleon

THE Napoleon car has a four-cylinder motor which will be used in a chassis having selective gearset, disk clutch, two-unit starting and lighting, battery ignition, semi-floating rear axle, vacuum feed and cantilever rear springs.

Napoleon Auto Mfg. Co., Napoleon, Ohio

Nelson

THIS very light weight four-cylinder newcomer was described and illustrated in the Dec. 28 issue of MOTOR AGE. The designer of the car had in view the production of a light-weight vehicle economical, yet capable of carrying five passengers under adverse conditions with a quick pick-up and relative high maximum speed. In attaining this there are several unusual features which are more in line with unique locations of parts than any mechanical innovations. Interesting items in the make-up of the car are the overhead camshaft and the unit transmission assembly in which is incorporated the clutch, gearset and rear axle gears.

E. A. Nelson, Detroit, Mich.

Overland

THE new model 85 Overland six takes the place of the previous model 83. One notable change is the increased use of pressed steel to take the place of heavier castings. An example of this is in the rear axle housing. Another important alteration is in the spring suspension which is now cantilever.

The gasoline tank has been moved to the rear and a new form of rigid tire support has been incorporated. The use of a leather universal is another innovation. Riding comfort has received particular attention in this model. The body provides ample seating room for five-passengers on the 116-in. chassis. The seats in the new models have been built lower and deeper with a slight backward tilt, and the seat cushions are built on deep coil springs.

A departure for the Overland company is the abandonment of magneto ignition and the use of a battery distributer system in its place. A feature of the ignition system is the switch which incorporates a thermostatic throw-off arrangement by means of which it is impossible to drain the battery through neglect to pull out the switch button.

Willys-Overland Co., Toledo, Ohio

Princess

THE new Princess is larger, roomier and better equipped than previously. There is a new floating axle and a two-unit electrical system. With the new Disco electrical installation, a Bendix gear is used for the starting motor. To take care of the larger car, bigger brakes have been installed. The speedometer drive is now from the gearset gears. The new running boards are linoleum on wood, aluminum-bound instead of aluminum on sheet metal. An improvement has been made on the grouping of the instruments on the instrument board. The layout is now integral and contains the Van Sicklen speedometer, speedometer light, ammeter, oil gauge, King lock, and a fuse box with spring attached cover. By taking out four screws the entire instrument assembly can be lifted out.

Princess Motor Car Corp., Detroit, Mich.

Pullman

CHANGES in the new Pullman include a two-unit electrical system, Bendix drive on the starting motor, gasoline tank in the rear with vacuum feed, a streamline body and rounded top, roomier seats, a slanting windshield and a larger front axle. The radiator is higher than the previous one, adding materially in the grace of the streamline body. Lamps are enameled black instead of nickled and two paint combinations are optional. The ammeter is on the cowl instead of under the hood and the instrument board is more compact.

Pullman Motor Car Co., York, Pa.

Regal

THE new Regal 4 thirty-two enters the field of moderate priced cars. It can be considered an entirely new model, and comes to succeed both of the four-cylinder models that were offered last year. The engine is entirely new. The frame is of tapered form instead of being straight as in previous cars. The gearset is in unit with the engine, a new starting and lighting system of Heinze make is fitted, the drive is all changed, a better rear axle has been adopted, the gasoline tank has been removed from the cowl and placed at the rear and a new body and hood of tapered form have been fitted.

Regal Motor Car Co., Detroit, Mich.

Reo

REO is continuing its four for another season with a few changes. There is a new straight-line body with a slanting windshield. This body is roomier and more luxuriously upholstered than the previous one. In fact, the car, as a whole, is a much more comfortable one for the passengers.

Throughout the chassis no changes of importance will be noted. Here and there little details have been altered. More forgings are used than heretofore, these being used in the spring hangers. The new springs adopted are the patented Marshall type. The Rayfield carbureter has been adopted.

The Reo might rightly be termed the 50 per cent oversize car. In every part where a strain is heavy there is oversize construction. An example of this is in the spokes which have a section about 50 per cent greater than is ordinarily used.

Reo Motor Car Co., Lansing, Mich.

Richmond

THE makers of the Richmond will start production for 1917 on an entirely new series of cars. The entire car practically is manufactured in the Richmond shop. This includes the motor, gearset, rear axle, steering gear, body, top, fenders, universal, etc. The new models are improved as compared with the old in the following points: Higher speed engine, new method of rear axle drive, elimination of unnecessary parts, driving generator through timing gear and shaft instead of silent chain, fitting the carbureter to the engine block instead of a long carbureter pipe, centrifugal water pump instead of gear, lighter pistons and connecting rods, counter-balanced crankshaft, pressure oil feed instead of splash, four motor bearings instead of seven, semi-elliptic underslung rear springs instead of three-quarter elliptic, frame of 1½-in. greater depth, wheelbase increased from 120 to 124 in., and a body of new type with a high cowl, convex sides, well-tilted seats, and a slanting windshield.

The Wayne Works, Richmond, Ind.

Saxon

MUCH improved over the previous series is the little four-cylinder Saxon roadster. Together with an increase in price the equipment has been materially added to and the body revamped in most commendatory fashion. For the first time this model is supplied with full electrical equipment, including a two-unit Wagner starting and lighting system and electric head and rear lamps.

The size of the tires has been increased from 28 by 3 in. on clincher rims to 30 by 3 Goodyears on demountable rims. These two important equipment additions, together with an electric horn and a speedometer, lift the little Saxon to an equal plane with high priced cars in the matter of completeness.

The body shape is quite new, and gives the car a longer and heavier appearance. Much thought seems to have been given to the matter of comfort in this new four with the wider seat and considerably better upholstery.

Saxon Motor Car Co., Detroit, Mich.

Scripps-Booth

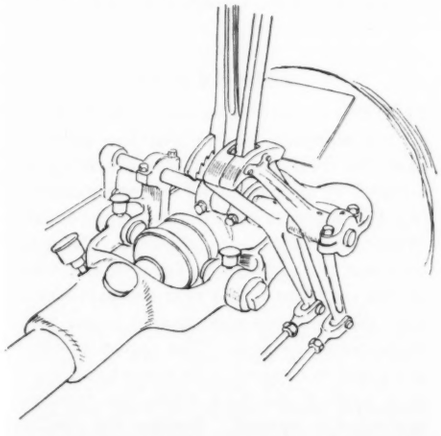
THE four-cylinder Scripps-Booth runabout is unchanged. Except for a few refinements the new model is identical with the original car of this type brought out 2 years ago.

One of the mechanical features of this high-grade small car is the easy adjustment of the inclosed overhead valves. This is accomplished by turning a nut protruding through the top of the cover plate after the oil cap has been removed. Consequently the valve may be adjusted while the motor is running.

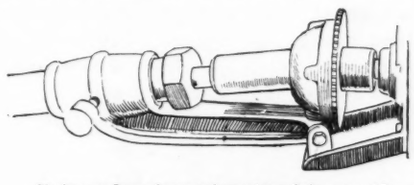
Scripps-Booth Co., Detroit, Mich.

Stearns

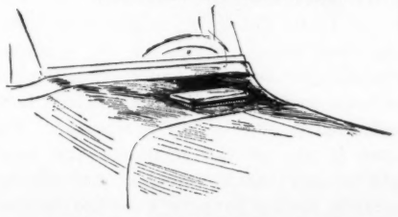
THE 1917 Stearns four-cylinder, Knight-motored car has a new body. This has the heavy comfortably appearing



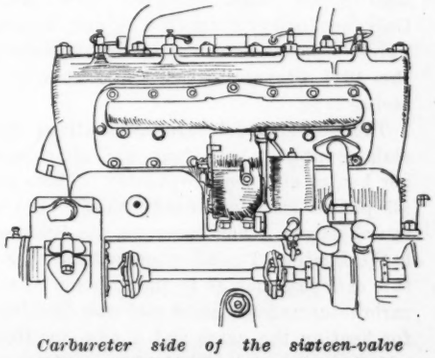
Unit assembly of universal, torsion tube, gearset and brake on the Crow-Elkhart



Universal and speedometer drive on the main shaft of the Ross eight



Air vent in the Chalmers closed cars



Carbureter side of the sixteen-valve White, which shows two universals between pump and magneto

double-cowl type with high sides and deep seats. The dash is now made of mahogany and is fitted with a Stewart speedometer. Mechanically the only material change is the use of a disk clutch instead of a cone. One of the most popular models on this chassis, the four-passenger chummy roadster, will be continued without change. A change of $45 on the four-cylinder models now is effective.

F. B. Stearns Co., Cleveland, Ohio

Studebaker

BETTER finish, better equipment, and refined mechanical characteristics without radical changes appear in the 1917 Studebaker four. This model has been given a price increase of $55. Gunmetal finish of gray with black fenders is the most striking addition to the appearance of the car. The bodies are otherwise much improved, noticeably in the design of the auxiliary seats, which are large and well upholstered and slide entirely out of sight under the rear seats when not in use. Another new feature in the matter of seating is found in the reversible front-passenger seat.

Other features designed for the comfort and convenience of the passengers are Blackmore storm curtains which open and close with the doors without any buttoning and unbuttoning of the curtains necessary, door pads, semi-glazed upholstery of genuine leather, all-wool tonneau carpet, silk mohair top with leather edging, and a new Yale switch lock of the pin-tumbler type to insure the car against theft.

Mechanically the improvements are slight. Probably the most important is a reduction of 12½ per cent on the weight of the pistons, making them 5 ounces lighter than in the 1916 cars. This reduction in weight has been accomplished by milling out the piston skirts.

Studebaker Corp., Detroit, Mich.

Stutz

THE eye-opening announcement of Stutz for the 1917 season centers around the adoption of the sixteen-valve Stutz racing motor with modifications into a stock speedster. The new motor is a product of the Stutz factories and is the latest type of high speed, high efficiency powerplant. Only one body is applied to the sixteen-valve chassis. This assembly represents the 1917 Stutz Bearcat being strictly a racing type.

The other models are the Bulldog specials coming in both four- and six-passenger bodies and a new roadster. These are all placed on a standard chassis of 130-in. wheelbase. The motor in the Bulldogs is the familiar T-head cylinder type with a few changes, such as in the location of the carbureter and manifold and new facilities for heating the gases and a new manifold which has a water jacket of unusual capacity. Besides the water jacket there is a flexible hot air tube to the carbureter from a stove on the exhaust manifold. The rear springs have been increased in length from 50 to 56 in., these lying perfectly flat when the car is loaded.

Stutz Motor Car Co., Indianapolis, Ind.

Templar

THE Templars Motor Corp., recently organized, will manufacture a four-passenger roadster at $1250, a five-passenger touring car at $1250, a five-passenger sedan at $1850 and a two-passenger roadster at $1225.

Templars Motor Corp., Cleveland, Ohio

White

A FOUR-CYLINDER motor with sixteen valves is the feature of the new White cars. Although the engine itself is a radical departure from the four-cylinder, two-valves-per-cylinder motor, which this company has previously produced, there are also a number of notable departures in the chassis design. For the first time in White practice the motor, clutch and gearset are in a unit. The new engine has plain bearings instead of the previous ball-bearing design which is continued on the other model.

The cylinders have removable heads, another new feature, and instead of the dash oil reservoir the oil is carried in the lower part of the crankcase. The gearset lever is a cane type with a standard gate, replacing the cross over shifting arrangement formerly employed. Semi-elliptic springs are employed and spare tires have been removed to the conventional location in the rear instead of being carried in a well on the running board.

White Co., Cleveland, Ohio

Willys-Knight

CANTILEVER springs and improved bodies, together with a pressure feed lubrication system and a distributer replacing the magneto are high lights in the changes of the Willys-Knight for 1917. The car has a completely new rear axle and a new gearset in combination with the axle. Naturally with all these improvements the price has been slightly increased. The offering includes a seven-passenger touring sedan of the Springfield pattern and a seven-passenger limousine, besides the seven-passenger open car.

Willys-Overland Co., Toledo, Ohio

Woods Dual Power

THE Woods dual power car is the first of its kind to be produced. It incorporates a gasoline motor and an electric motor working separately or together, connected on the same drive line. The Woods electric has been discontinued. The new car is really an electric car which does not require a service station inasmuch as the gasoline motor serves to charge the storage battery which drives the electric motor. On a cold morning the car may be started on the electric motor and run at a rate of 20 miles an hour, turning the gasoline motor over any length of time until it starts. Then the car may be driven on the gasoline motor alone or on both powers.

Woods Motor Vehicle Co., Chicago

Six-Cylinder Cars

Abbott

CHANGES in the Abbott for 1917 are confined mostly to the body. There is now to be found double cowl, French lap upholstery instead of buttons and adjustable brake and clutch pedals. A chummy roadster has been added to the line, which is claimed to be as roomy if not more so than any on the market. Four color options are offered. There is a new Grant-Lees gearset and a Salisbury axle.

Consolidated Car Co., Cleveland, Ohio

American Six

THE American six embodies the ideas of Louis Chevrolet, engineer and veteran race driver. It is in the medium-price six-cylinder class and much attention has been paid to detailed refinements both mechanically and in the equipment. The frame is one of the strongest and most rigid of any car in its class and all the brackets, spring hangers, etc., are secured with particular care. Every provision has been made to eliminate squeaks and rattles. An interesting feature of the lubricating system is the tunnel which incloses the camshaft. This tunnel always carries lubricant and the lower ends of the tappets dip into it.

American Motors Corp., Plainfield, N. J.

Anderson

THE Anderson program includes a five-passenger roadster which is unique in that the rear seat can be folded up and covered by a very simple operation converting the car into a two-passenger roadster. When the rear seat is closed, the space between the individual front seats, which allows entrance to the rear compartment, is also closed by an upholstered panel which folds from the floor. The opposite side of the panel is covered with carpet and serves as a part of the floor when the rear compartment is opened. Besides the roadster model this manufacturer offers a five-passenger touring car, six-passenger and seven-

passenger touring cars and a two-passenger roadster, all mounted on a single chassis powered with an L-head Continental motor.

Anderson Motor Car Co., Rock Hill, S. C.

Apperson Roadaplane

THE motor size of the Apperson six follows the practice of 1916 cars as do the general principles of design, but mechanical refinements throughout make a much quieter and more powerful vehicle. The new car sells for $200 more than the one with the same motor size in the previous model. Dry-plate disk clutches take the place of the contracting band clutches previously used. The design, finish and equipment of the bodies are luxurious and thoroughly well planned. Particular stress is laid on the new chummy car which is similar in seating arrangement to the four-passenger roadster of the 1916 Apperson model. Apperson Bros., claim to have been the first to introduce this type of body.

Apperson Bros. Automobile Co., Kokomo, Ind.

Auburn

TWO sixes, new in motor size and body, with a variety of bodies constitute the 1917 Auburn offering. The motors are similar in design, the difference being principally in size. An interesting feature in line with the present practice of reducing weight in the reciprocating parts is the embodiment of light lever arms which are carried on a shaft, this shaft mounted to a plate which forms a part of the valve housing cover.

The lower side of the lever arm rides on a cam at the end opposite the supporting shaft while the lower end of the valve stem rides on the upper side of the arms. This supplants the usual type of push-rod. There is a four-passenger tete-a-tete roadster which is an innovation as far as Auburn is concerned. The rear seat will accommodate two large passengers and affords plenty of leg room.

Auburn Automobile Co., Auburn, Ind.

Ben Hur

THE newly-announced Ben Hur might be termed a medium high-priced six. The prices being $1875 for the touring car and cloverleaf roadster and $2750 for the touring sedan. It is an assembled car with such standard parts as Buda motor, Bosch magneto, Westinghouse electric system, Timken axles, Stewart vacuum feed, etc.

Ben Hur Motor Co., Cleveland, Ohio

Bour-Davis

BOUR-DAVIS is bringing out a new model which will be exhibited for the first time at the New York show. It will be mounted on the same chassis as the old model but will be larger, more luxurious and more completely equipped. It is 9 in. longer than the old body, providing an extra amount of leg room in the driving compartment and in the tonneau. Genuine leather upholstery is used and there are special patented springs in the back of the cushions, such as ordinarily are found in the highest-priced cars. A few of the details which have been added are: motor-driven pump, clock, automatic cigar lighter, genuine haircloth carpets, German silver trimming on the top, and special tool kits set in the door.

Bour-Davis Motor Car Co., Detroit, Mich.

Buick

THE production of the little six model Buick is being continued without change for the coming year. This overhead-valve, five-passenger job is now so familiar to the majority of motorists that a description is almost unnecessary.

Particular emphasis is laid on the easy riding qualities of this car attributed to its low-hung and well-balanced body and its cantilever rear-spring suspension.

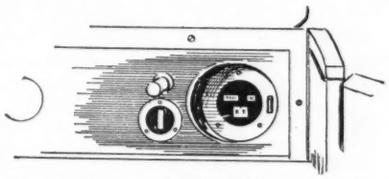
To supply an urgent demand direct toward Buick for a seven-passenger car this maker will show a new job with a new motor. The double-cowl has been adopted in an up-to-date streamline body. The valve-in-the-head construction is, of course, adhered to, with some modifications.

Buick Motor Car Co., Flint, Mich.

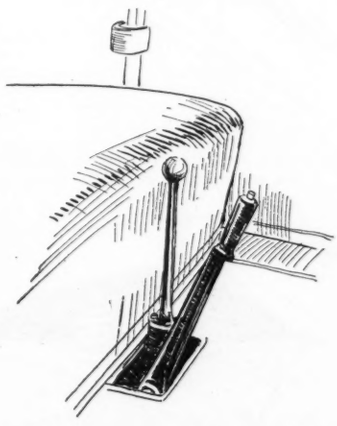
Chicago

THE Chicago light 6-40 makes its initial bow as the 1917 production. Among the claims of its sponsor is that it has the lowest center of gravity of any car made in the United States, still maintaining the 10-in. road clearance. Bright metal finishings are taboo in the Chicago, these being white enamel. Among those parts that are white enamel are the radiator, rims of the lamps, the windshield frame and the wheels, while the balance of the car will be a solid color which has been named Lake Michigan blue.

Pan-American Motor Corp., Chicago



Speedometer on the Inter-State is set at angle to face driver



Maibohm has located the control and brake levers close to the front of the driver's seat which makes the floor of the driving compartment especially clear

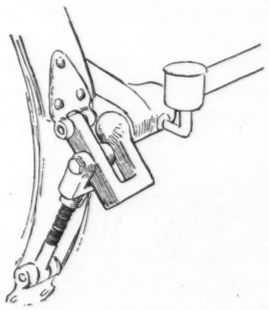
Chalmers

THE Chalmers model 6-30 is offered in a variety of body styles in which are found a five-passenger touring car, two-passenger roadster, cabriolet, seven-passenger touring car, Lucille sedan, town car and limousine. Particular emphasis is laid on the appointments of these new bodies.

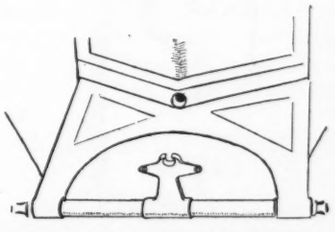
Pertinent to the present demand for inclosed cars, it might be well to mention a few of the Chalmers features in these models. Lucille—Lady Duff Gordon—the renowned designer of women's wearing apparel, has personally selected the upholstery material for all Chalmers inclosed cars. The effect is notable in the quiet but elegant appointments of the interior. In the tonneau are to be found completely appointed cases operated by springs and concealed except when in use. The right hand case contains a smoking set with removable ash tray, and at the left is milady's toilette with mirror, card case, memorandum book, etc. There are vases, clocks, hassocks, and umbrella holders with artistic dome lights, comfortable lounging pillows and silk window curtains and floor carpets, harmonizing with the interior finish.

There is a choice of several well-selected color options in all the closed cars. Chalmers 6-30 will be built in two lengths of wheelbase, a 115-in. five-passenger car, and 122-in. seven-passenger model.

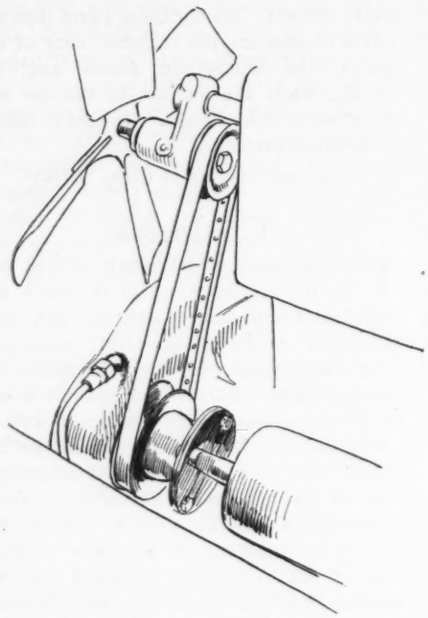
Chalmers Motor Co., Detroit, Mich.



Yoke in the brake assembly of the Lexington, which gives a very powerful leverage



The Scripps-Booth has a support for the starting crank when it is necessary to crank the motor by hand



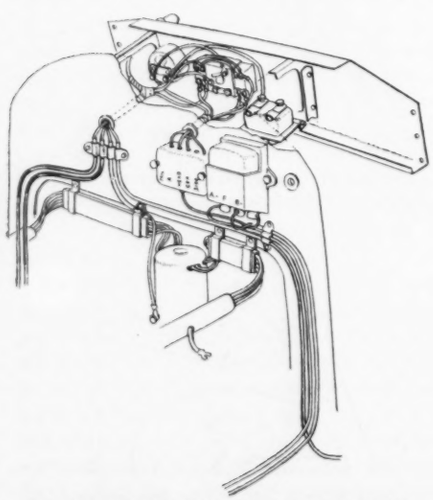
Drive for the fan on the Grant six is taken from the end of the generator shaft

Chandler

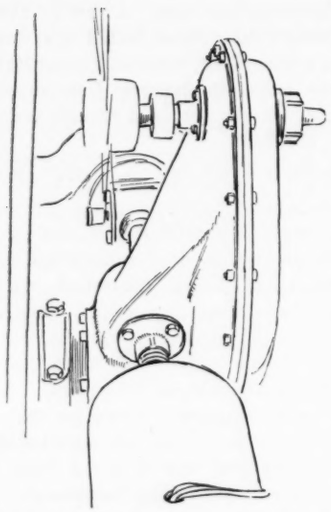
CLOSED bodies are late features of the six-cylinder Chandler production. The four-passenger convertible coupe is of the Springfield design with the same seating arrangement as the Chandler roadster, namely a cloverleaf pattern with a wide rear seat accommodating two. However, there is even more room in the coupe seats than in the roadster as the baggage compartments at the sides have been removed thus giving an additional five in. in the seat.

The convertible sedan is also of the Springfield type with the usual side windows that may be removed, giving an open body effect. The auxiliary seats face forward and swing forward and down into compartments in the back of the front seats. The interior finish is simple, yet effective, a feature being a five-in. mahogany panel across the center of the door and around the compartment. Four color options are offered.

Chandler Motor Car Co., Cleveland, Ohio



In the Standard eight all the wiring and electric fixtures are assembled on the dash



The generator and pump on the Ross eight are mounted at right angles to the motor and driven by worm gears inclosed in the case which houses the chain to the fan located above

Charter Oak

THE Charter Oak is a high grade assembled proposition combining a Herschell-Spillman six-cylinder engine, a four-speed Brown-Lipe gearset and Timken axles.

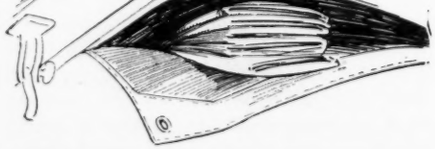
Eastern Motors, Inc., Hartford, Conn.

Davis

THE new Davis car is mechanically the same as in 1916. The only body change evident is in the shape of the hood, which now gives a clean sweep from the radiator to the cowl, there being no break evident.

George W. Davis Motor Car Co., Richmond, Va.

Pierce-Arrow has its carbureter choker on the steering column



Pierce-Arrow has improved the arrangement for storing the curtains in the top so that there is no bulge

Detroiter

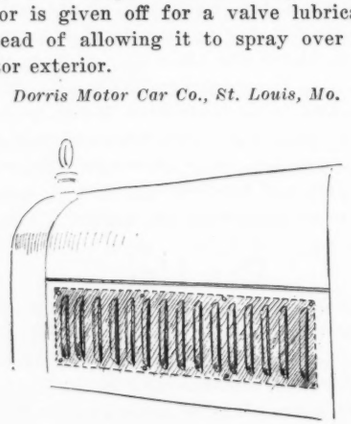
THE only new model which will be produced for 1917 will be a four-passenger roadster. All present models are continued with changes as follows: Borg & Beck clutch, Detroit Gear and Machine gearset, and Thermoid universals at both ends of the driveshaft. The bodies are lengthened, widened and lowered, the length having been increased 8 in. giving 3 in. more space in the front compartment and an additional 5 in. in the tonneau. The rear seat is now 47 in. wide inside the upholstery. On all cars the paint, upholstery and the details of finish are greatly improved.

Detroiter Motor Car Co., Detroit, Mich.

Dorris

DISTINCTIVELY new bodies appear on the new Dorris. The bodies are very roomy, befitting a car of this price and is completely appointed to the most minor details. The earmark of the car is the new radiator which is directly copied from the Peugeot design. The characteristics of the sturdy six-cylinder motor are retained in original form with a few alterations in the nature of refinements. A feature of the oiling system is the provision for direct oiling of the overhead rocker-arm bearings from the pressure pump. Another minor feature, but one which shows careful thinking on the part of the designers, is that the breather tube opens into the inclosed overhead-valve compartment utilizing what oil vapor is given off for a valve lubricant, instead of allowing it to spray over the motor exterior.

Dorris Motor Car Co., St. Louis, Mo.



Hudson employs a plate under the louvres of the hood cover to keep out the cold in winter

Cadillac has a special cap for the gasoline tank that uses a thumbscrew, after the cap has ben screwed down, to clamp a leather gasket over the opening

Elco

THE Elco six-cylinder cars will remain the same as last year, except that a Rutenber 3⅛ by 5 motor will be used. This car is an assembled proposition and is manufactured in comparatively small quantities by an old established company.

The Bimel Automobile Co., Sidney, Ohio

Elgin

AN ADDITION in wheelbase length and adoption of the center cowl gives the Elgin even more speedy lines than it had a year ago. Full cantilever spring suspension is a high light in the chassis of the new car. The springs are very long and are swung beneath the frame which permits the much-sought-for flat horizontal spring with cantilever construction. The new frame is a substantial proposition, an extra cross member having been added further to increase the rigidity. The motor is a Falls overhead-valve six with 3-in. bore and 4¼-in. stroke in which the intake manifold has been eliminated and the carbureter now bolts directly to a flange cast on the cylinder. The intake manifold is integral with the cylinder head.

Elgin Motor Car Corp., Chicago

Empire

NEW body lines throughout, giving liberal seating capacity, and a stronger chassis, are revealed in the Empires to be announced at the New York show. The new cars are refinements of those of a year ago for the only mechanical change is in the rear drive with the adoption of the Hotchkiss type with floating rear axle. The new chassis designated as model 70 is fitted with two bodies, the Tu-dor convertible sedan and the touring car, each having a 120-in. wheelbase. The high deep cowl topped by a tilted windshield and the curved sides of the body accentuate its size. The double cowl effect is combined with divided parlor-car front seats. Two standard colors in upholstery combinations are offered, these being in cobalt blue body with black, long-grained leather upholstery and an autumn brown body with Spanish-leather upholstery to match.

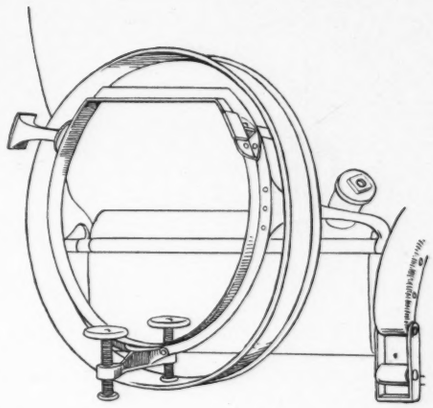
Empire Automobile Co., Indianapolis, Ind.

Franklin

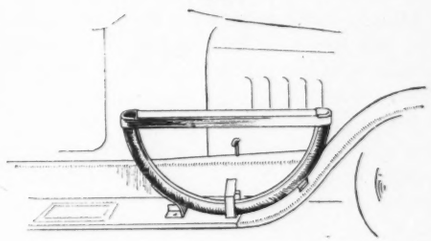
ALWAYS an adherent to the principle of lightweight construction, Franklin has again reduced the weight of its product a matter of 400 pounds by scientific cutting down where weight was found to be unnecessary. The new engine is lighter, being a trifle smaller in bore, the gearset has had several pounds cut out and both axles are considerably reduced. In the smaller parts, pounds and ounces have been cut out here and there to swell the aggregate reduction. In the new car there are 133 separate drop forgings, 150 pieces made of aluminum and many of these supplant malleable iron castings and sheet metal parts. The most apparent exterior change is a new hood carrying out the Franklin dropped front shape, but being gracefully rounded into unbroken curves.

Typical of the use of aluminum are such units as the rear axle gear case engine base and oil pan, valve cages and covers, gear-case, carbureter body, mud guards, running board shields, body and hood. In the design of the front axles, 30 per cent of the weight has been saved in comparison with the previous type and in the rear axle 25 per cent. The motor is of small size, but the factor of light weight gives the car ample power. Aluminum pistons have been adopted to lighten reciprocating parts and make the motor quieter. The most marked change in the motor is the substitution of Atwater Kent ignition in place of the magneto. The air-cooling system is maintained with the same principle of draft created by the flywheel.

H. H. Franklin Mfg. Co., Syracuse, N. Y.



Tire carrier employed on the Standard eight



Saxon carries a spare tire on the right running board

Geneva

THE Geneva six is another newcomer in the moderate-priced six-cylinder class and is built up of such standard parts as Herschell-Spillman motor, Brown-Lipe gearset and clutch, Timken axles, front and rear, Fedders radiator, Rayfield carbureter and Westinghouse starting and lighting with an Eisemann magneto for ignition.

Schoeneck Co., Chicago

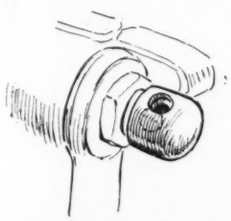
Glide

ALTERATIONS in the Glide are such as to render it more roomy and to increase the factor of safety. There also have been a few alterations which serve to making the car more nearly silent. Probably the most noticeable change is in the motor where the bore has been increased from 3 to 3⅛ in. The crankshaft has been rendered more rigid by increasing the diameter ⅛ in. to 2 in. A fabroil gear is used in the camshaft drive for silence. The rear seat is 47 inches wide and the springs have been lengthened both front and rear.

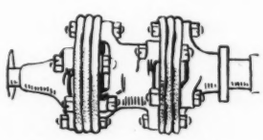
Bartholomew Co., Peoria, Ill.

Grant

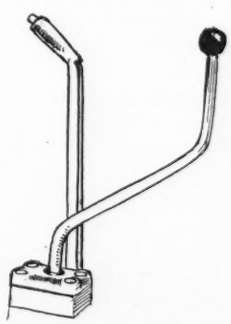
ALTHOUGH the most noticeable change over the previous Grant six is in the body lines, there are a number of mechan-



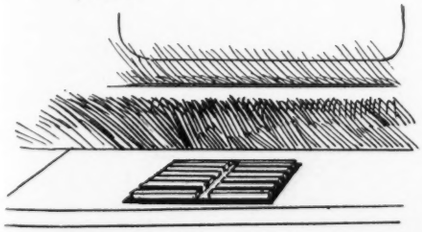
A special oil cup is used on the springs of the Haynes. The outer part turns until the two openings correspond, then oil is put in and the cap turned to close the hole



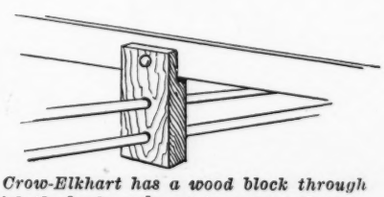
Type of leather universal used on the Overland



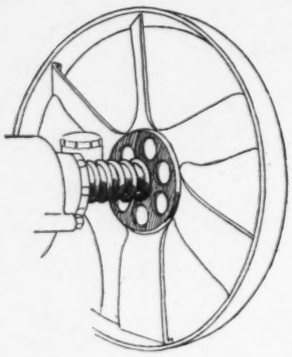
The control levers of the Jackson are novel in shape

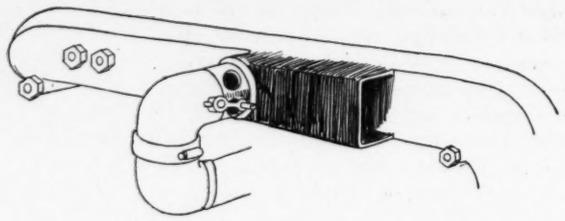


Hudson makes use of a rubber scraper to clean the feet before entering the car



Crow-Elkhart has a wood block through which the brake rods run to prevent them rattling





Above, Overland hot air intake integral with manifold. Left, spring clutch on Cadillac fan

ical improvements that help to make it a better car. A Wagner two-unit starting and lighting system replaces the single unit type and Remy ignition is fitted in place of that used in 1916 production. Stromberg carburetion gets a place along with a change in the fuel system from the cowl tank to a reservoir at the rear from which gasoline is drawn by Stewart vacuum feed. The bodies are quite changed. The radiator is rather high and unusually narrow and there is a boat-like sweep from this to the back of the rear seats. Grant has entered the inclosed-car field with a convertible sedan and convertible coupe. In all bodies particular attention has been paid to roominess and provision for the comfort of the passengers. In attaching the gasoline tank to the rear, the same supports are used to carry the spare tires. This feature is found on the touring model. On the roadster the extra tire is housed in the rear deck.

Grant Motor Corp., Findlay, Ohio

Haynes

FOR the coming season Haynes will offer two chassis types which carry either the six-cylinder or twelve-cylinder motor. The latest announcement in the new offering is a four-passenger roadster which will be fitted on the 127-in. wheelbase only. The rear seat in this model is 44 in. wide and the distance from the front of the rear to the back of the front seat is 30½ in. With a seat width of 17 in. one will understand there is plenty of leg room in this rear compartment. The model 36 six-cylinder car has 121-in. wheelbase, and the model 37 a 127-in. wheelbase.

Besides the four-passenger roadster there are five and seven-passenger touring cars and a very attractive Springfield type touring sedan with removable side panels.

Haynes Automobile Co., Kokomo, Ind.

Hollier

A six-cylinder car of small size has been been added to the Hollier ouput, which heretofore was confined to eights only. Probably the most noticeable feature of the new motor is the accessible arrangement of the valve action, it being of the overhead valve type. This is entirely contained in the cylinder head which is detachable, thus allowing the valves to be readily ground besides affording easy access to the pistons and cylinders. All of the valves are actuated by a single camshaft through use of a rocker arm motion and this camshaft is driven through helical gears, steel against iron, running in a bath of oil.

Lewis Spring and Axle Co., Chelsea, Mich.

Howard

THE Howard makes its first appearance as a 1917 model in touring roadster, sedan and coupe. The powerplant is a Continental with a bore of 3¼ in. and a stroke of 4½. The company gives three color options on the touring car and roadster with a number of options on the sedan and coupe.

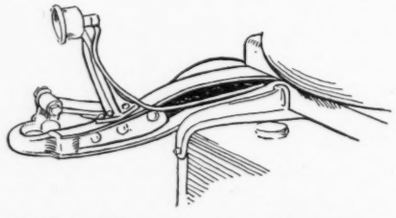
A. Howard Co., Galion, Ohio

Hudson

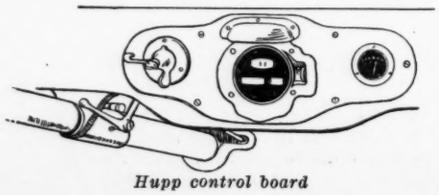
THE Hudson Super-six is being continued without mechanical change. The bodies also remain the same. The most recent announcement concerning Hudson cars centers around the new radiator shutter which may be mounted on any Hudson Super-six radiator or will be furnished at the factory on new cars at extra cost. This shutter is operated from the driver's compartment and is designed to regulate the water temperature for most efficient operation regardless of the atmospheric temperature. It also provides the means of heating the motor quickly when starting in cold weather. A Boyce Motor-Meter is essential as part of this equipment.

The Hudson Super-six with its counter-balanced crankshaft is now almost too familiar to need description. The motor on a slightly altered form has made very creditable showing on the speedways during the past season.

Hudson Motor Car Co., Detroit, Mich.



Method employed by Stutz for hanging springs to rear end of frame



Hupp control board

Jeffery

JEFFERY has joined hands with a number of other manufacturers in the matter of price increase, there being a raise of $100 on the three six-cylinder models which include a seven-passenger touring car, a roadster, and a seven-passenger sedan. Jeffery bodies are generally considerably lower than they were a year ago and the beauty of lines is enhanced by what the makers term the roll-edge, which is in reality a tumbled-in top which differs from the usual type of tumbled-in top inasmuch as the slope comes more or less from a straight-side body instead of a curved-side body.

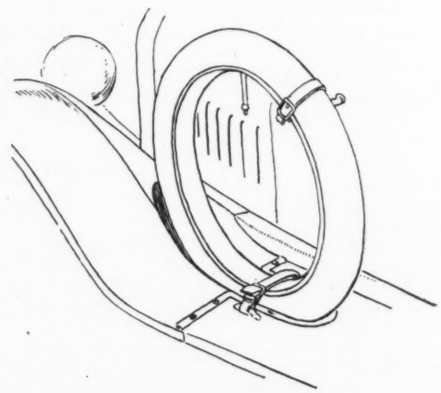
The new seven-passenger sedan is particularly attractive in its straight-line characteristics which are carried out all the way through, even to the interior arrangement.

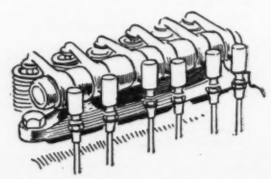
One feature of the Jeffery which varies considerably from present-day practice is the use of straight-side members in the frame. This frame is provided with four cross members, making it one of great rigidity. The gasoline tank and spare tire support are hung directly onto the frame in the rear, by the use of side rail extensions.

Nash Motors Co., Kenosha, Wis.

Jones

THE 1917 Jones 6-60 is an entirely new product. It has a 3½ by 5¼-in. motor, combination force feed and splash system of lubrication, Stromberg carbureter,





Above—Oakland's method of tire carrying. Below—Overhead valve arrangement

Timken axles and a modern streamline body, placed on a 123-in. wheelbase chassis. There is included a seven-passenger touring car and a touring sedan with a demountable top. The 1916 five-passenger touring car has been discontinued, and the above two models, together with a four-passenger roadster complete the new season's offerings.

Jones Motor Car Co., Wichita, Kan.

Jordan

A LUXURIANTLY appointed body is placed on a chassis built up of high-grade assembly units in the Jordan car which was a newcomer in the 1916 season. The car is thoroughly distinctive in its lines and in pace with the demand for originality a great number of color options are offered to suit any taste. The upholstery is of the best hand-buffed leather. The back of the front seat contains folding seats which drop into compartments and are covered by leather flaps. All of the rest of the seat back is light mahogany, built in a true custom-built style of job made with many pieces with matched grain. There are omitted no small details of body equipment which could contribute to the comfort of the occupants.

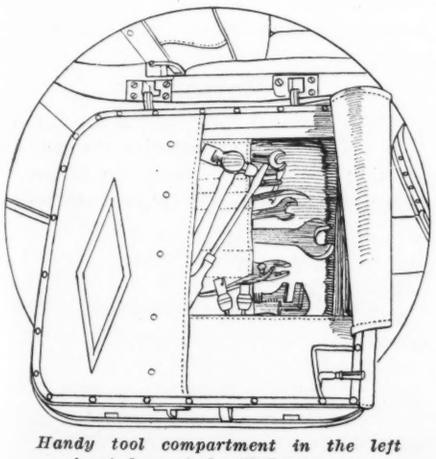
Jordan Motor Car Co., Cleveland, Ohio

Kisselkar

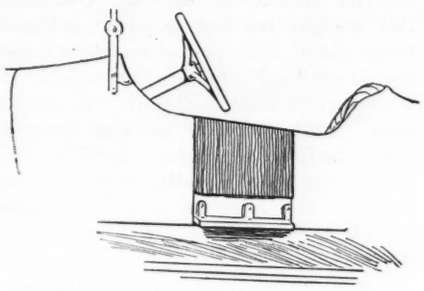
SCIENTIFIC reduction of the size of parts and modifications necessary to the constructon of a lighter vehicle has produced the new Kissel hundred-point-six which is a moderate priced car retaining the general principles of design and thorough workmanship which have characterized previous models of this make. The bore of the new motor is ⅜ in. smaller than that of the 1916 model 42, while the stroke is ½ in. smaller. The 5-in. shorter wheelbase tends toward weight reduction throughout the chassis construction. In fact the weight has been so reduced that tires of 32 by 4 size are sufficient to handle the load, whereas the model 42 was equipped with 35 by 4½ tires.

Of course one of the particular talking points of the Kisselkar is the All-Year body type which is to be had on the new chassis in sedan, coupe and town car styles. These detachable tops are fitted to the bodies with wallpaper smoothness in the Kissel factory. Removable, inclosed bodies will be continued on the 5-42 chassis also, for the 1917 season.

Kissel Motor Car Co., Hartford, Wis.



Handy tool compartment in the left front door of the 1917 *Paterson*



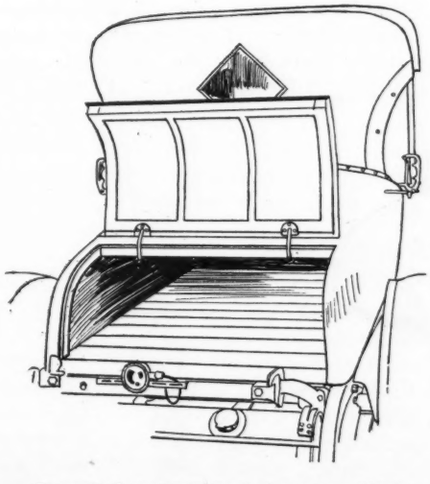
Protective pad used in Stutz

Klinekar

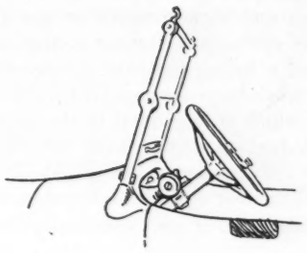
FOR the 1917 season the Klinekar line will be featured by a Shamrock roadster of the four-passenger cloverleaf design mounted on the same chassis as the touring car and roadster which, except for minor details, is practically the same as the chassis used in 1916.

Among the features are simplified adjustment of the carbureter, protection of the driveshaft, which is the open type with two universals, by a U-piece attached to the cross member to prevent any damage in case the shaft should break, holding it in suspension. The front wheel bearings have been increased in size as well as the hubs and the rear axle housing has been increased in thickness and reinforced by an extra tube riveted to the housing. Bodies have been changed to the double cowl design with streamline effect, the windshield has been slanted and the top material has been changed to Neverleak.

Kline Car Corp., Richmond, Va.



Rear deck compartment for spare tires of the 1917 *Allen roadster*



Close-coupled bracing for steering column in Reo

Lexington

TWO chassis and a rather wide range of body styles will make up the Lexington line for 1917. One is an entirely new chassis known as the 6-T and the other is an improvement on the 6-O of 1916. The 6-N model has been discontinued.

There are a number of minor improvements, such as moving the battery under the driver's seat, substitution of heavier bearings in the front wheel and changes in body design to give better appearance and comfort as well. A Schebler carbureter is used now instead of a Rayfield.

The rear spring suspension has been improved, the forward end being dropped several inches so that the center of gravity is a straight line from front to rear. Headlights on both models are now mounted on the radiator and the Moore multiple exhaust system, designed to give added horsepower with a smaller fuel consumption, is continued. Leatherette is now used instead of mohair as a top material.

Lexington-Howard Co., Connersville, Ind.

Liberty

DISTINCTIVE body lines characterize the new Liberty six-cylinder car. Built on a wheelbase of 115 in. this car strikes you at first glance with its sharp angles and straight lines not usually found in the body types of the day. These have been blended into what might be called colonial tendencies with various curves and angles, being proportioned to produce a harmonious effect. This car is Continental motored with Delco electrical equipment, Timken axles, Borg & Beck clutch, Detroit Gear and Machine Co. gearset, Rayfield carbureter, etc.

Liberty Motor Car Co., Detroit, Mich.

Locomobile

THE Locomobile chassis and body for 1917 follow much along the lines of the last six years except for detail changes intended to give the final touch of refinement which are designed specifically to be the last word in beauty and luxury. Broadly speaking the new cars are more beautiful in appearance because they are lower and longer. They are more easy riding, due to a rearrangement of the sus-

pension and are faster, having better acceleration and higher maximum speed due to a new carbureter, lighter reciprocating parts and a better balanced motor. These changes have been accompanied by a boost in price which is so general in the industry now. A feature of the body offerings is the new four-passenger job of which only a limited number will be constructed.

Locomobile Co. of Am., Bridgeport, Conn.

Lozier

THE seven-passenger touring car and a limousine is built on the Lozier six chassis, which has 132-in. wheelbase. The feature of the Lozier six is the direct method of drive. The motor is of Lozier construction throughout and has a bore of 3⅞ in. and a stroke of 6 in. Electric system is Gray & Davis. The Lozier six makes use of the special tire carrier and there is also a trunk rack in the rear which combines with the tire carrier, the trunk fitting inside the spare tire. The headlights are fitted with special dimmers which meet the requirements of most city ordinances.

Lozier Motor Co., Detroit, Mich.

Madison

ALTERATIONS in the appearances of the bodies constitute the principal Madison changes, the lines having been made to correspond to the flat cowl design so much in vogue. On the five-passenger body a single front seat is used, while on the seven-passenger, the boat-shaped design is carried out with divided front seats and auxiliary seats which fold against the back of the front seats when not in use. The cushions are comfortably slanted and there is an abundance of leg room in the front compartment. The powerplant is a six-cylinder, L-head Rutenber.

Madison Motors Co., Anderson, Ind.

Marion-Handley

THE recently announced Marion-Handley car has a six-cylinder 3½ by 5¼ block-cast motor of the L-head type, with an aluminum crankcase. The body lines in this car carry out the principle of a straight line from the top corner of the radiator back to the rear seat. Combining this straight-line feature with tumbled-in body sides and the gracefully-rounded double cowl and slanting windshield, the whole car is indeed attractive in appearance. Much attention has been given to riding qualities, the rear springs being very nearly flat, semi-elliptic with a 57-in. length. The color is dark olive green and all bodies are hand filled, rubbed and finish.

Mutual Motors Corp., Jackson, Mich.

Marmon

THE changes in the Marmon are negligible, being little refinements here and there to make this light-weight and powerful car more perfect. The Marmon is a big car, yet it weighs no more than a good many makes that are much less powerful and roomy. This weight reduction is attained by the extensive use of aluminum, the cylinder casting being made from this metal as also the body panels, radiator shell, rear axle gearbox and fenders. The particularly easy-riding qualities are obtained by the use of compound cross-suspension cantilever springs.

Nordyke & Marmon Co., Indianapolis, Ind.

McFarlan

CONCENTRATING on one chassis and one motor size, a departure from previous practice, the McFarlan Motor Co., will devote its entire attention in 1917 production to one model—the McFarlan 90. Among the features are a complete line of smart body designs covering everything from the touring roadster to the Victoria touring in open cars, and from the large Berlin to the speeding sedan in inclosed cars.

One of the most distinctive features offered is that of an option of a full magnetic transmission built under the latest patents. This transmission is furnished on the same chassis as the regular sliding gearset, but at an advance in the list price of $1,000.

There are no radical changes in engineering features, the principal difference being in matters of refinement and design, among these being the low cradle spring suspension for appearance and comfort and a better design of valve pockets and firing chambers in the motor, which give greater power and efficiency.

McFarlan Motor Co., Connersville, Ind.

Mitchell

THE 1917 Mitchell six is a larger, roomier and considerably more beautiful car than the previous issue. Machanically changes are confined to minor refinements and such increases in strength and size of parts as was made necessary by the 2-in. increase in wheelbase. There is a large number of body types offered, all having the high and narrow radiator and smooth sloping hood.

Two little items which indicate the extent to which comfort has been considered are the glove compartment in the instrument board and the tonneau light in the back of the forward seat. Within the instrument board there is fitted a new compartment in which small traveling requisites may be carried and which is locked by the same key that operates the ignition lock.

The makers have announced four new inclosed cars, a cabriolet, sedan, limousine and coupe. The sedan is of the Springfield type and is finished upholstered and equipped in limousine style. The cabriolet is another fore-season model and is a three-seater, an auxiliary seat for the fourth passenger.

Mitchell-Lewis Motor Co., Racine, Wis.

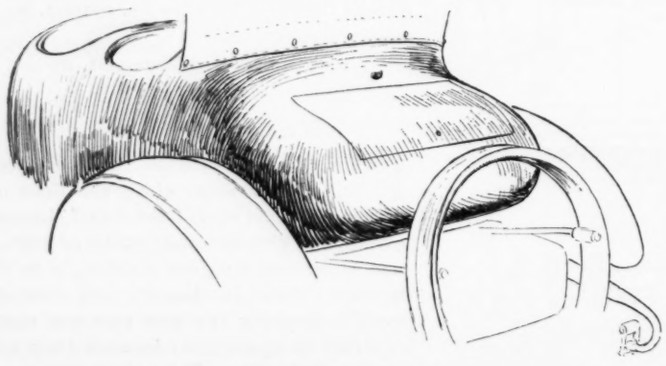
Moon

THE most recent change in the 1917 Moon model is the advance of $40 on the 6-66 effective January 1. The price of this car is $1,690, while that of the 6-43 is continued at $1,295. The latest models are equipped with high radiators, these being about three in. higher and narrower on top, a high-cowled body and a low, slanting windshield, whereas the earlier 1917 models were equipped with a high windshield. The lower windshield gives the car a much better appearance. In fact, the few body changes which have been made, make he two new sixes appear bigger, more powerful and of much more graceful outline.

Moon Motor Car Co., St. Louis, Mo.

National

THE National Highway six is being continued without material change. Following the general trend the prices are somewhat higher. The car is characterized



Haynes four-passenger roadster has baggage compartment in rear deck

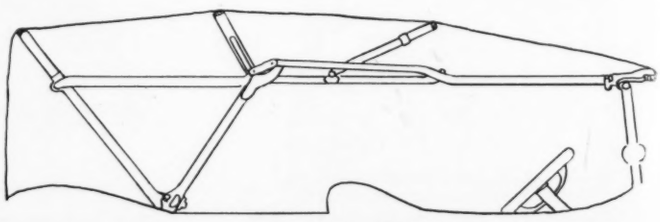
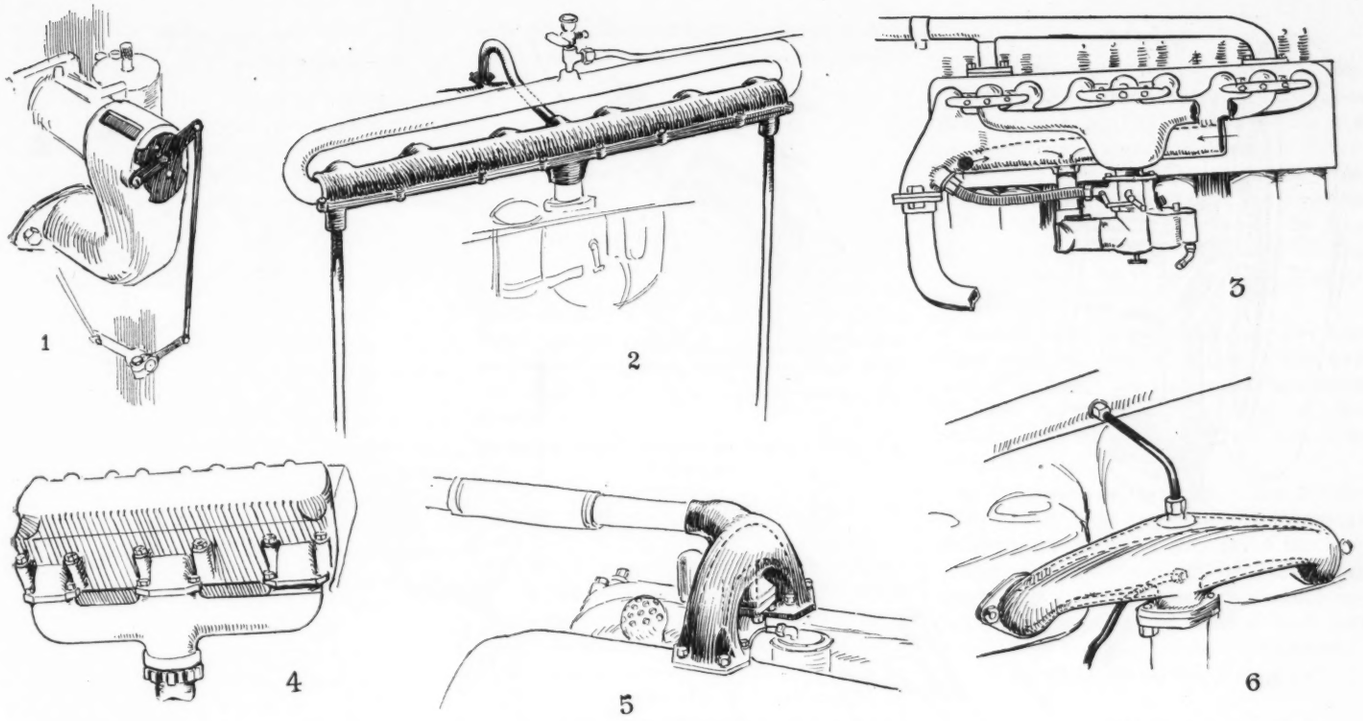


Diagram of Cadillac top



Manifold refinements on 1917 *engines.* 1, *Carbureter on Hupmobile, showing unusual air intake.* 2, *Franklin's manifold heater.* 3, *Buick's hot air intake integral with the exhaust manifold.* 4, *Manifolding on the Jackson eight.* 5, *Packard's water-jacketed intake.* 6, *How the Stutz intake is heated by the water*

by its long low lines which has been a National feature for a number of years. In fact, the National company was one of the pioneers in the low-hung, straight line type of body.

National Motor Vehicle Co., Indianapolis, Ind.

Oakland

THE most recent announcement concerning the Oakland model 34 is a price increase from $845 to $875. The car differs considerably from the model 32, although the overhead-valve-six motor is retained with but very few changes. Probably the greatest improvement is in the body, which is much roomier than heretofore. Another attractive alteration is found in the new semi-elliptic rear spring suspension, replacing the three-quarter elliptic in the previous model.

The springs are now underslung and are carried low under the frame by special hangings so that they lie very nearly flat when the car is under load, a feature which is characterizing a great many new models. Delco lighting, starting and ignition is used in the same form as it was on the later model 32s which replaced the other make used on a large number of the early model 32s.

To give an idea of the roominess of the new body, the front seats are 42 in. and the rear seats 46 in. wide inside the upholstery. In the rear compartment there is a space of 46 in. from the back of the front seat to the front of the rear seat back.

The new body carries out the flaring design from hood to rear seat so much in vogue.

Oakland Motor Company, Pontiac, Mich.

Overland

OF course the most recent Overland announcement is the price change which has just gone into effect. The model 75-B is a new series which has taken the place of the previous four-cylinder car. It is characterized particularly by a larger motor with 3⅜-in. bore and 5-in. stroke which is claimed to develop 31½ hp. at 1915 r.p.m. and to have a speed of from 2½ to 53 m.p.h.

Another feature of the car is that it is equipped with 4-in. tires. It has cantilever suspension, two-unit, six-volt starting and lighting and the body is now fitted with a one-piece cowl which slopes back in a graceful curve.

The new model on this chassis is the club roadster which is a four-passenger job of rather unique construction. The interior is strictly boat shaped, having a well-rounded back into which the rear seat is blended. The color of this new car is battleship gray with upholstery of a delicate gray shade. Wire wheels are standard.

Willys-Overland Co., Toledo, Ohio

Owen-Magnetic

OWEN Magnetic cars are built in nine models, four on the 125-in. wheelbase chassis and five on the 126-in. wheelbase chassis. In presenting the new styles it means that for the first time bodies built in the company's own shops are placed on the Owen Magnetic chassis. There are touring cars, coupes, limousines, town cars, landaulets and cloverleaf roadsters, all of very distinctive and attractive appearance. Of course, the big feature in these cars, as it has been previously, is the use of a magnetic form of gearshift, if gearshift it might be called.

The Baker R. & L. Co., Cleveland, Ohio

Paige

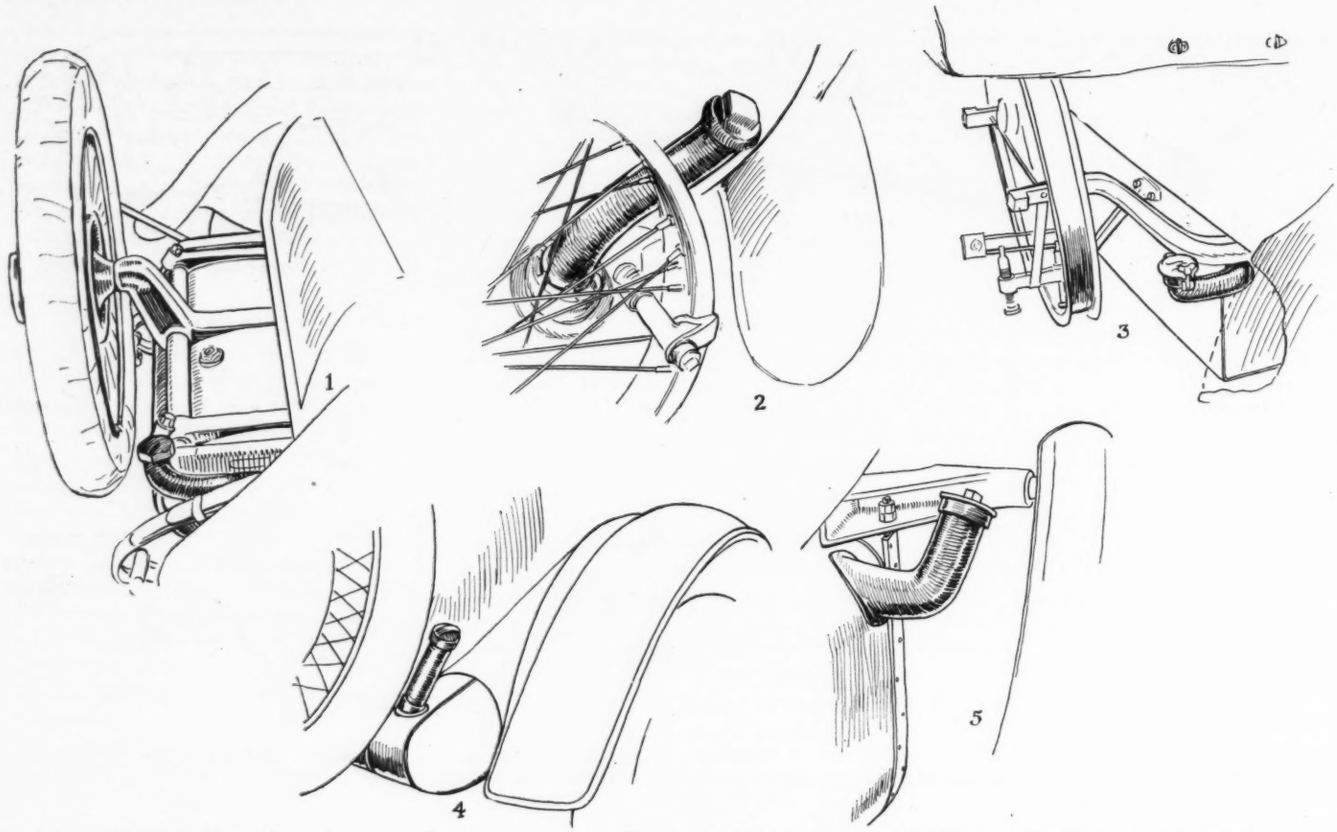
THE latest feature in the Paige products is a convertible two and four-passenger roadster which will be announced for the first time at the New York show. This new body contains very unique and ingenious features of design. The top which resembled a canopy type is alterable either to cover the front two seats alone or the front and rear seats both. By a unique assembly the rear compartment may be entirely decked over when desired.

The new series announced some time ago includes a continuation of the Fairfield, model 6-46, and in addition, a smaller six-cylinder car known as the 6-38, continued without change. The changes in the 6-46 are not radical, but include body changes, such as sloping windshield, new upholstery in which the leather is arranged in piping, better springs in the upholstery, leather door flaps, and a mahogany instrument board. The only mechanical change is the addition of a single-cylinder tire pump which is mounted on the gearbox, and which is driven by a reverse idler.

Paige-Detroit Co., Detroit, Mich.

Paterson

THERE are two important mechanical changes and a new four-passenger roadster body in addition to a new design



Spare wheels and tires make necessary special arrangements for filling fuel tanks. 1, *Jeffery.* 2, *Winton.* 3, *National.* 4, *Scripps-Booth.* 5, *Another ingenious method*

of touring car body with the popular double cowl effect in the new Paterson. Mechanical changes are the adoption of a Hess floating axle and the use of a Hotchkiss drive whereby the drive and torque are taken through the rear springs. In the body perhaps the most noticeable differences are the new lines and the wider and longer dimensions which add to the roominess of the vehicle. As an added touch of modernity, the windshield has been given a slight slant. To give more leg room to the front seat passengers, this seat has been moved back a few inches.

W. A. Paterson Co., Flint, Mich.

Pierce-Arrow

THE changes in the Pierce-Arrow models are very slight. In all essential details all three six-cylinder models are the same as heretofore. The water outlet is neater; the wiring has been simplified; the battery distributer is now mounted on the generator, eliminating the separate commutator shaft and driving gears; the positions of magneto and generator have been interchanged so that the water pump will absorb the intermittent torque reaction of the magneto; spiral-bevel driving gears have been adopted; the pressure of the oiling system has been raised and an ammeter has been substituted for a voltmeter on the cowl. Of course the high-class finish and complete equipment in this car are retained.

Pierce-Arrow Motor Car Co., Buffalo, N. Y.

Pilot

A FIVE-PASSENGER, double-cowl touring car and a four-passenger get-chummy, both on one chassis, are Pilot's 1917 offerings. The new chassis replaces two of the previous production year and the new motor is block-cast of the L-head type with cylinders cast integral with the top of the crankcase. The cam, pump and magneto shafts are driven by helically-cut gears inclosed in an oil-tight case. In the get-chummy model the rear seat is 41 in. wide and an accessible suitcase apartment is located in the rear. Entrance is gained through a section of the back of the rear seat, which may be lifted out, making a large opening into the curved back of the body.

Pilot Motor Car Co., Richmond, Ind.

Premier

THE entirely new Premier has an overhead valve motor, mostly aluminum, and a magnetic gearshaft. The obvious features are its projectile body lines, an unusual amount of passenger room in proportion to its wheelbase obtained chiefly by placing the motor well forward and into the V of the well-pointed radiator. The cylinder block and the crankcase are one aluminum casting and within the cylinder bore there is slipped a gray-iron sleeve held from downward movement by a shoulder that fits a recess in the aluminum casting and held from upward movement by the cylinder head casting which carries the valves. The valve mechanism is entirely inclosed, although the overhead principle is employed.

Gearshifting is accomplished by the use of a magnetic shifter manufactured by Cutler-Hammer. In the cooling system a thermostat is embodied by which the water is kept at an efficient temperature. The fan and impeller of the fater pump are mounted upon a single, small hardened and ground shaft.

Premier Motor Corp., Indianapolis, Ind.

Reo

ON THE Reo six there is an entirely new body with sloping windshield, auxiliary seats which now fold into the back of the front seat, new plaited upholstery in place of the tufted and better equipment such as robe cords on the backs of the divided front seats and a top which is rounded off in the rear giving a limousine effect.

There is also more seating room in the car, the body being 2 in. wider at the point of juncture of the windshield. Mechanically, few changes have been made.

The engine has been provided with more complete methods of heating the air and the inlet lifter mechanism has been improved so that there is a better guide alignment for the roller follower. The crankshaft diameter has been increased somewhat and now transmits the drive through a new form of fabric universal.

Reo Motor Car Co., Lansing, Mich.

Roamer

ONLY one model of the Roamer will be made for 1917. This is the same chassis that was used last year with a few minor refinements. The principal changes are the addition of a roadster and inclosed bodies, whereas the manufacturer made only one body type last year, except on special orders.

Barley Motor Car Co., Streator, Ill.

Saxon

THE new Saxon six is a decidedly better looking car than its predecessor, although that car was a most attractive vehicle. It has a somewhat altered body line to bring it into accord with present-day body fashions, the straight-line effect being well carried out. The body is 4½ in. longer, wider and in every way more roomy and has a slanting windshield and new style crown fenders making its body lines modern to the highest degree.

In addition to greater comfort due to softer and deeper cushions, new cantilever springs are fitted which are of the full instead of the half-cantilever type. These new springs are 41½ in. long which, contrasted with those in the previous model which were of 30-in. length, shows one that the riding qualities are considerably improved.

Several changes are to be found in the motor, perhaps the most important of which is the increasing of the size of the crankshaft.

Saxon Motor Car Co., Detroit, Mich.

Simplex

SIMPLEX follows its previous policy in building chassis only and these chassis are built with the idea of producing the ultimate in motor car production regardless of price. The chassis price of $6000 is indicative of the material and workmanship which is put into this huge car. The model V Simplex chassis has a wheelbase of 143½ in., carried on 36 by 4½ in. tires in front and 37 by 5 in the rear. The six-cylinder motor has a bore of 4.375 and a stroke of 6.25 in.

Simplex Automobile Co., New Brunswick, N. J.

Singer

WHILE the major percentage of bodies for the high-priced Singer cars are custom built the concern is marketing a standard roadster, touring and closed cars. The standard touring design is a seven-passenger type with the Belgian double cowl. There is a number of detailed improvements in the new chassis, such as Magnalite pistons, pressure oiling instead of splash to the connecting rod bearings and a longer, lower body, although the wheelbase is shorter. The wheelbase is now 136 in. instead of 138. There is a new design of gasoline tanks which is of rectangular section instead of cylindrical. The rear springs are now flatter under load than they were formerly, tending toward easier riding.

Singer Motor Co., New York

Stephens

THE Stephens six is built to carry five-passengers and includes such features as bevel gear drive, adjustable pedals and a distinctive body finish in deep blue and gold striped with wheels of old ivory. Color options requiring thirty days notice are Brewster green, maroon or black with old ivory wheels or wheels to match the bodies.

Stephens Motor Branch of Moline Plow Co., Moline, Ill.

Studebaker

FROM a manufacturing standpoint, the outstanding feature of the Studebaker line is its standardization. The four and six are exactly similar in design throughout. Both motors have their cylinders cast in a single block of similar dimensions, 3⅞ by 5, and with all parts similar from one end of the chassis to the other, excepting where structural dimensions differ, on account of difference in the power plants.

Studebaker characteristics which have been continued this year are the rear axle gearset, cone clutch and Wagner electric lighting and starting. Motor changes are described in the short description of the four-cylinder car, except that it is not mentioned that the oil pump has been changed slightly in the way of making a tighter fitting pump, which has increased its ability.

The generator has been improved by alterations in the wiring which gives much better charging characteristics. About 3 amp. increase of current is furnished the battery at a car speed of 15 m.p.h., while the maximum charging rate has not been altered. Another detailed change in the electrical equipment is in the head lamp mounting by means of which the lamp can be turned and fastened in any position.

Studebaker Corp., Detroit, Mich.

Sun

FOR 1917 there will be four different bodies, all on the same chassis, comprising a five-passenger touring car, four-passenger roadster, seven-passenger touring car, and five-passenger sedan. The general features of design will remain the same as in the 1916 models. The Sun motor is built in the Elkhart factory and has such special features as dual-ejector exhaust manifold, roller valve lifters, and flexible three-point suspension. A new seven-passenger touring car and four-passenger roadster are of the double-cowl type with slanting windshield. Hand flaps have been added to all doors.

Sun Motor Car Co., Elkhart, Ind.

Velie

THE 1917 Velie Biltwel line is a continuation of its two sizes of six chassis with several marked alterations in the nature of refinements and distinctly different bodies which are roomier and even more gracefully designed than any previous models offered by this factory. In line with the policy of the majority of the manufacturers, the new cars are slightly increased in price.

Timken axles and bearings are now featured with all models. More power and greater economy are claimed to have been obtained in minor refinements of the power-plants, and the use of the new axle constructions.

In the design of the Velie bodies for the new models, no attempt has been made to follow what might be considered the conventional type of construction. They are thoroughly distinctive and of weighty appearance. High grade leather and real curled hair are used in the upholstery.

Velie Motor Vehicle Co., Moline, Ill.

Westcott

NEW streamline bodies, a few mechanical changes, an increase in price in the big six and a discontinuation of the small six appear in the 1917 Wescott offering. The new body lines are of the streamline effect with full-curved cowls and a full bell-curve in the rear of the body. All models are swung considerably closer to the ground than heretofore giving a center of gravity four inches lower. Sloping windshields have been adopted and the aisleway between the front seats is two inches wider than previously. The bodies are of the bulging type, the sides being well rounded and tumbled in.

Westcott Motor Car Co., Springfield, Ohio

Willys

WITH the exception of a longer hood, the new Willys seven-passenger 88-Six is identical in outward appearance with the Willys-Knight Four. This is not a Knight motor job, however, but is of conventional L-head type. Cantilever springs have been substituted for three-quarter ellipties, battery ignition through the Connecticut system has taken the place of the magneto, the gearbox used on the 1916 Willys-Knight has been adopted, and the gasoline tank has been removed from under the seat to the rear of the car, the change bringing with it the installation of a Stewart vacuum feed system.

The motor in this car is a Continental and starting and lighting is performed by the Auto-Lite system. The lines of the body are unbroken from front to rear. The radiator edges are rounded and the radiator is slightly higher; the top edge of the body is rolled in and there is a double cowl and tilted windshield.

Willys-Overland Co., Toledo, Ohio

Winton

NO changes have been made in either of the Winton models. It is moreover not Winton policy to announce season models, but rather to adopt what changes are found advisable as soon as arrangements can be put through the factory. The buyer of a Winton is encouraged to suit his taste in details of finish and equipment and consequently a great variety of options are offered at the regular selling price. Not only are the body colors optional but also the selection of the leather for the upholstery. Even the position of the seats, height from the floor, etc., will be made according to the purchaser's own ideas. Special bodies of over seventy-five styles were turned out in 1916.

Winton Co., Cleveland, Ohio

Eight-Cylinder Cars

Apperson Roadaplane

AS far as size is concerned the Apperson eight motor is the same as its predecessor. However, it has been mechanically refined so that the power is materially increased. It sells for $150 more than its predecessor. The light eight motor is constructed in blocks of four with L-head cylinders and the motor is the only material difference from the chassis construction in the new six. Springs are three-quarter elliptic in the rear.

Apperson Bros. Automobile Co., Kokomo, Ind.

Cadillac

THERE are eleven body styles in the new Cadillac. Comfort is enhanced by the addition of 3-in. to the wheelbase and lighter pistons produce an even more vibrationless motor. The new models are truly luxurious vehicles. Dark blue is now the standard color on the open cars and dark green which has been standard on all models since the eight was announced, is now found on the closed cars only.

The appearance is enhanced by the adoption of crown fenders and the addition of a molding around the top of the body and new headlights which, in a general way, follow the shape of the coat of arms on the radiator. The latest addition to the mechanical parts of the car which is just announced is the installation of a tank suspended to the frame and connected with a pipe to the radiator outlet. The purpose of this tank primarily is to condense anti-freezing liquids which may evaporate in the radiator, making it perfectly practical to use alcohol only as an anti-freeze solution. The radiator is sealed by a gasketed filler cap so that a vacuum is created. When the water and anti-freeze solution evaporates it passes through the overflow pipe and into the tank and is there condensed. Then when the radiator cools, contraction causes a suction which brings the water and alcohol back into the radiator.

Cadillac Motor Car Co., Detroit, Mich.

Chevrolet

THE Chevrolet eight has a characteristic valve-in-the-head motor and is fitted with a double-cowl body which is the last word in body style. It is a distinctive design in that the body sides are not horizontal but gradually curve from the front cowl to the double cowl and from there to the rear. The motor is 3⅜ by 4 and the overhead valves are carried in a detachable head.

Chevrolet Motor Co., Flint, Mich.

Cole

THE Cole line for 1917 will include four models and one chassis — a Cole-Springfield Toursedan, a Cole-Springfield Tourcoupe, a seven-passenger touring and a four-passenger Tuxedo roadster. Very few changes have been made in the Cole eight chassis since the company began the production of eights. A wide solid truss midway between the steering wheel and rear axle takes the place of the torque and radius rods, drive being taken from the rear springs. The crankshaft in the Cole motor is counterbalanced by electrically welded weights which largely prevent whipping of the shaft or slapping of pistons.

Cole Motor Car Co., Indianapolis, Ind.

Cunningham

THE Cunningham makers are now building an eight only in a high-priced car selling from $3,750 to $5,250. The distinctive Cunningham body is carried out in the new chassis. The offering includes four, six and seven-passenger touring cars, a roadster, a limousine and a combination car. Upholstery in the limousine will be fitted to suit the owner's taste. The Cunningham motor has the largest piston displacement of any twin motor on the market.

James Cunningham Sons & Co., Rochester, N. Y.

Daniels

THE 1917 Daniels models are a continuation of the 1916 cars with a very few changes. They will be equipped with Timken axles, Gemmer steering gears and Klaxon horns. The additions are in the way of new inclosed bodies, such as the carbriolet, the landau, brougham and the suburban Berline. The carbriolet seats three and has provision for a chauffeur in the rear. This seat folds into the rear deck when not in use. Ample carrying space is provided. The suburban Berline may be used as a car for the owner to drive or with a chauffeur, provision being made to throw the inside into one by lowering of the glass partitions.

Daniels Motor Car Co., Reading, Pa.

Ghent

THE new Ghent 8-40 is a 120-in. wheelbase well-powered car selling for $1050. There is introduced on these cars a safety device which is a combination tail light, automatic warning signal to the car behind and license place illuminator. Pressure on the brake pedal operates the signal. The standard wheel equipment on this car is the Parker hydraulic steel wheel with spokes of press steel, giving an assembly of very light weight.

Ghent Motor Co., Chicago

Hollier

IN the design of the Hollier eight particular attention is given to the comfort of the passengers both in the body design and in the spring suspension. The body is low with wide seats upholstered in genuine leather and stuffed with curled hair. There is an abundance of leg room in the front and rear compartments. The rear springs are forty-two inches long, of the cantilever type, making this light-weight car very smooth riding.

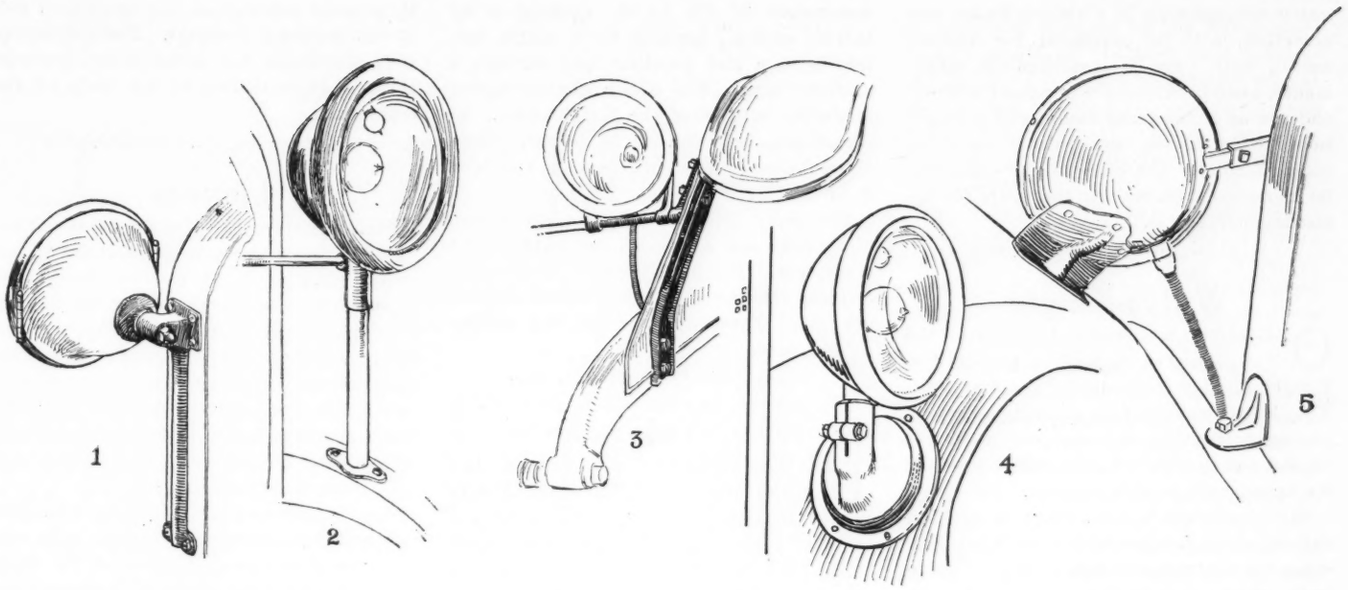
Lewis Spring and Axle Co., Chelsea, Mich.

King

THE altered body lines are at first the most noticeabe change in the new eight-cylinder Kings. This change starts with the radiator, the shape of which has been altered so that it represents a shield to conform with the King trademark and this hood line is then swept straight back to the cowl and from there curved down and directed on a straight line to the front seat. The chassis is identical with the previous model except that a Stewart vacuum feed is used.

A new four-passenger body is one of the additions to the 1917 program. This car, designiated as the Foursome, is characteristically in the sporting type. In the driver's compartment are two individual bucket seats, 19 in. wide and 19 in. long and the rear seat measures 42 in. wide, giving plenty of room for two passengers. There are little conveniences of detail which contribute to the comfort of the passengers. On the seven-passenger touring car a special drawer has been arranged under the front seat for carrying tools. The rear seat cowl board is of Circassian walnut and in the center of this is a light which is also a combination trouble lamp which may be taken out and carried to any part of the car. The cord is self-winding. There is a small compartment under the tonneau cowl board where small articles can be carried.

King Motor Car Co., Detroit, Mich.



Arranging the lamps on the new cars. 1, Lexington adjustable. 2, Jeffery with double bulbs. 4, Case. 5, Buick stamped bracket

Murray

THE new Murray is a high-priced seven-passenger car placed on a 127-in. wheelbase chassis. The car is largely an assembled one, using a unit powerplant composed of an eight-cylinder Herschell-Spillman motor and a Covert gearset. Other parts used are Timken axles, Perfection springs, Bosch ignition, Gemmer steering gear and Blood universals.

Murray Motor Car Co., Pittsburgh, Pa.

Oakland

THE model 50 eight-cylinder Oakland will be continued for another season with practically no changes. This car is distinguished by its massive appearance and consequent roominess, its great power in proportion to the weight and its long springs which contribute materially to easier riding qualities. It carries the characteristic Oakland V-type radiator which has been used by this company for a number of years.

High lights in the specifications of this car are as follows: Aluminum pistons, underslung rear springs, three-quarter elliptic 53⅜ in. long, 34 by 4½-in. tires all around, coach green finish with wheels and chassis black as standard, and 127-in. wheelbase.

Oakland Motor Car Co., Pontiac, Mich.

Oldsmobile

IN mechanical make-up and general characteristics, the Oldsmobile 45 is a continuation of the previous model 44. Although the bore and stroke, wheelbase and general dimensions are unchanged, there are enough improvements both mechanically and in appearance to make the model quite new. The radiator is entirely new, with a distinctive fluted oval of solid German silver.

Throughout the car considerations of comfort are predominant. The 120-in. wheelbase with a very short hood made possible by the compact eight-cylinder motor provides unusual leg room, while high body sides and deep seats give the cozy sensation of seating in, not on the car.

The Lynite pistons are continued, but under very different design, in which mechanical perfection has reduced oil pumping to the minimum. There are three rings above the wrist pin and one below and six holes are drilled in the lower edge of the bottom ring groove and six in the upper edge. There are also two opposite holes at right angles to the wrist pin.

Olds Motor Works, Lansing, Mich.

Peerless

THE Peerless eight-cylinder car will be continued for another year without change. Following current practice the price will be increased $90, this to take effect March 1. There is no mistaking a Peerless car for any other. The familiar radiator shape which has characterized this make for a number of years is retained with alterations to make it more graceful. The body lines are massive and have the appearance of comfort and luxury.

Peerless Motor Car Co., Cleveland, Ohio

Ross

FOR 1917, the Ross eight-cylinder car appears in a new dress that is in accord with the latest body fashions in every particular. The vehicle is practically the same mechanically as it was when the first model was brought out over a year ago. The modern double-cowl effect has been worked out at the back of the front seat and the hood slopes into the cowl without a break. The radiator shell also slopes to the hood in a very pleasing manner. Nothing has been forgotten in the equipment of the new Ross. The list of articles including a motor-driven horn, one-man top, Stewart speedometer ammeter, extra rim and tire carrier and the usual complement of tools.

Ross Automobile Co., Detroit, Mich.

Scripps-Booth

THE Scripps-Booth is characterized by its attractive and thoroughly different bodies and its easy riding qualities. The aim in the design of this car is to construct a light weight medium-powered vehicle selling at a price high enough to include equipment of the highest grade and workmanship of the best throughout the construction.

The new eight-cylinder model, which has been produced for some time in the form in which it will be continued carries a four-passenger body with divided front seat and the lines are characteristically Scripps-Booth. Accessibility is a feature in this eight-cylinder motor. The carbureter is high where it is easily reached. The heads are removable uncovering the valves, so that carbon removing is a very simple process.

Scripps-Booth Co., Detroit, Mich.

Standard

CHANGES in the new Standard car over previous model are: 3¼ by 5 motor instead of 3 by 5, Borg & Beck clutch, Grant Lees gearset, wheelbase increased from 121 to 127 in., Splitdorf magneto in place of battery ignition, and an increase of 3 in. in the length of the rear springs which gives a 56-in. overall dimensions.

Standard Steel Car Co., Pittsburgh, Pa.

Stearns

THE Stearns-Knight eight-cylinder motor, probably the first motor built in this country to incorporate a sleeve-

valve arrangement in a twin-cylinder construction, will be continued for another season with very few mechanical refinements, none of which are apparent without the use of a fine-tooth comb, and a larger body, which gives considerably more leg room in front. The price of the eight will be increased $100, making the figure for the touring car $2,250.

F. B. Stearns Co., Cleveland, Ohio

Willys-Knight

ONE of the mechanical features of the New York show will be the Willys-Knight eight introduced for the first time. The Toledo company is showing a seven-passenger touring car equipped with the second sleeve valve V-type motor to make its appearance in this country.

While distinctly new, there is nothing radical about the powerplant as it incorporates the features common to poppet valve twin motors and to the ordinary Knight type of vertical engine. The only feature that is unusual is that there are sixteen of the valve sleeves, two for each cylinder, driven off the eccentric shaft. Only one shaft is used, this being mounted in the center of the V above the crankshaft by which it is directly driven.

The eight cylinders are cast in two blocks of four and have bore and stroke dimensions of 3⅜ by 4. Cooling is by thermo syphon, ignition by a single battery system and gasoline feed through a vacuum tank. The entire chassis layout is similar to that of the Knight four. In wheelbase, however, it is longer. This figure being 125 in., whereas on the four it is 121 in.

The body fitted to this car has a one-piece cowl and a cowl on the back of the front seat. The upholstery is hand-buffed leather. Heavy sheet-steel crown fenders are used. The body lines are very similar to the four.

Willys-Overland Co., Toledo, Ohio

Yale

THE Yale eight is a new product and for the present will be supplied only in seven-passenger form. The standard color is ivory white for the body with black fenders and trim. The attempt to reduce wind resistance to the minimum is apparent in the body design. The hood is tapered to blend well with the rather deep cowl and the sides are perfectly smooth. The windshield is smartly raked and there is a cowl at the back of the driver's seat which serves to house the auxiliary seats. All doors are fitted with pockets.

Saginaw Motor Co., Saginaw, Mich.

Twelve Cylinder Cars

Austin

AS HAS characterized Austin design since its inception a good many years ago, every part on the car is built of the best materials obtainable and with watch-like accuracy letting the price fall where it may. The most distinctive features of the new cars are the body lines, which deviate materially from the customary practice. The car has next to the longest wheelbase of any American motor vehicle, the figure being 142½ in. Austin features are two-speed rear axle, double-cantilever springs and a compact and accessible twelve-cylinder motor.

Austin Automobile Co., Grand Rapids, Mich.

Enger Twin Unit

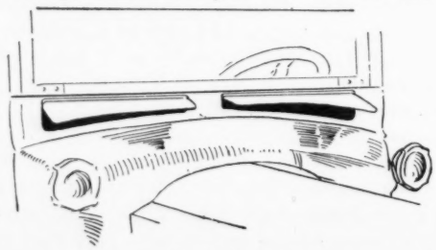
OF course, the most striking feature in the Enger twin-unit twelve is the principle whereby six or twelve cylinders may be used at the will of the driver. The principle which permits this is in merely lifting the exhaust valves in one set of cylinders and closing the intake pipe to that set of cylinders with a butterfly valve, thus putting the block entirely out of commission. The purpose of this arrangement is to afford high gasoline economy on smooth roads where the maximum power is not needed. The motor is very small size, being 2⅜ by 3½ bore and stroke and one can imagine that the gasoline consumption is very low with only six of the cylinders operating. There is a total absence of square corners in the make-up of the Enger body. In accordance with up-to-date practice it has a double cowl and a slightly slanted windshield.

Enger Motor Car Co., Cincinnati, Ohio

Hal

THE Hal seven-passenger touring cars and the roadsters follow the ultra in the latest fashion decree in body designs. There is to be found a double cowl, a rounded over top edge of the body and a straight taper from the radiator to the rear of the car. All in all these bodies give this new 135-in. wheelbase car a massive appearance. Befitting a car of its price the equipment is elaborate throughout. An interesting feature showing the completeness of mechanical detail is an efficient oiling system with an oil pump in the crankcase forcing a constant supply through individual pies to each of the three main bearings of the crankshaft and to the camshaft bearings. The connecting rods are oiled fro mthe main bearings through holes drilled in the webs of the crankshaft.

Hal Motor Car Co., Cleveland, Ohio



Packard's dash ventilator

Haynes

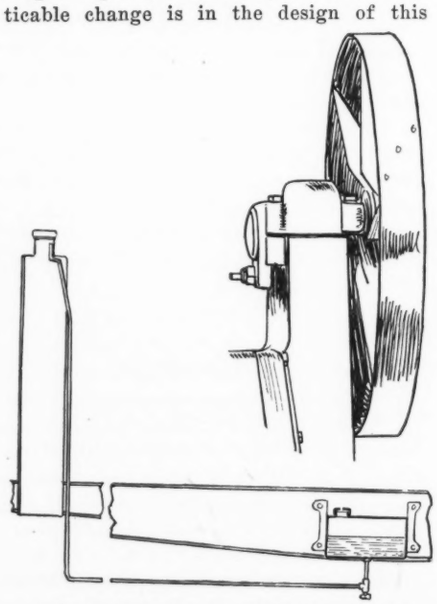
THE motor of the Haynes twelve-cylinder car is an interesting study in accessibility. It is of the overhead-valve type with all valve operating mechanism inclosed. There is nothing bulky between the cylinders except the carbureter and intake manifold and the adjustments on this carbureter are so located as to be very easy to get at. The distributer is shaft-driven and located directly behind the pair of cylinder blocks.

Again speaking of accessibility, the valves are constructed in a removable cylinder head and are arranged on the alley side of the cylinder blocks so that pushrods and valve adjustments are a simple matter. The spark plugs are set on the valve side of the block bringing all twelve of them within arm's reach. This motor is applied to the same two chassis as is the six, the motors being interchangeable. The twelve-cylinder models are known as model 40 and 41, and are set on 121 and 127-in. wheelbase chassis. The twelve is obtainable in a new four-passenger roadster body on the 127-in. chassis and in five and seven-passenger touring cars and Springfield type touring sedan.

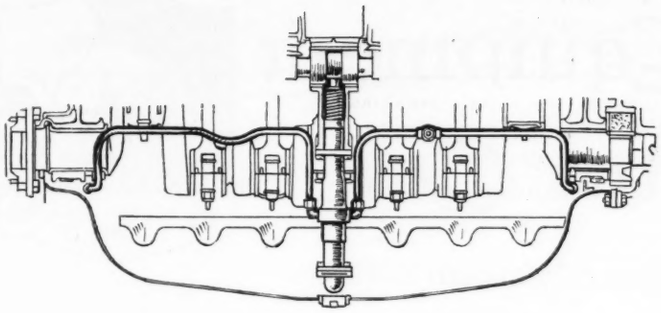
Haynes Automobile Co., Kokomo, Ind.

National

A NUMBER of detailed improvements have been made in the higher-priced National twelve. The touring body has been increased in size and now instead of being a six-passenger job, it has a full seven-passenger capacity. Probably the most noticable change is in the design of this



White's inclosed fan drive, above, and below, Cadillac radiator overflow reservoir



Pump for oiling system of the six-cylinder Marion-Handley motor

seven-passenger car. Although the chassis is the same length, the new body is three in. longer and has a center cowl and an aisle between the front seats. In the tonneau under the center cowl are two locked package compartments. The front seats are larger in every dimension and there is also more room in the driver's compartment. The body is wider than in the former series and there is more carrying capacity under each of the three seats. In addition there is a tool compartment on the left front door. The fenders are an inch wider and the windshield is now slanted. The cloverleaf design, which was marketed last year as a three-passenger body, has now been made into a full four-passenger job. In addition to the four-passenger and seven-passenger models there is a four-passenger touring car, five-passenger, All-Weather sedan of the Springfield type and a three-passenger coupe.

National Motor Vehicle Co., Indianapolis, Ind.

Packard

THIS early builder of twelves is making no changes of real importance for the 1917 series. As an example of the sort of minor changes that have been made, the alteration of the cylinder castings is the most striking. Formerly the Packard had a one piece L-head cylinder casting and this has been replaced with detachable cylinder heads which do not alter the relative positions of any parts of the engine.

In conjunction with the detachable cylinder heads there has been a change in the water outlet. There are now no separate water pipes running from the cylinder heads to the radiator. Instead of these the intake manifold is surrounded by a larger pipe which acts as the water outlet for the cylinders and a single separate pipe then connects the top center of the manifold to the radiator.

Another noticeable change is the lowering of the frame 2 in. which alters the appearance of the car to a considerable extent. Packard has also abandoned the horizontal end piece on the rear mudguards. The fenders now follow the curves of the wheels. There are two lengths of chassis. The larger is 135-in. wheelbase and the smaller, 126½-in., this being an increase of 1½-in. over last year.

Packard Motor Car Co., Detroit, Mich.

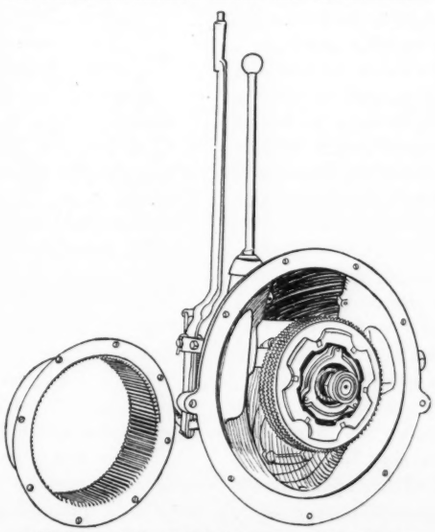
Pathfinder

THE first announcement of the 1917 Pathfinder appears in another part of this issue. A disappearing top and a tire carrier of unusual design are the most striking innovations although there are a number of other changes such as an entirely new frame, new method of seat springing, and auxiliary seats mounted direct to the frame and assembled with the chassis. The gasoline tank is now located in the cowl and the new body, which in the seven-passenger model, has the appearance of a roadster, is of the sectional type. The brakes have been increased in size and minor parts strengthened. An interesting feature which aids in making the seating lower to the ground is that the floor boards rest directly on the frame instead of on a sub-structure.

Pathfinder Motor Car Co., Indianapolis, Ind.

Remarkable Economy with Wilmo Manifold

CHICAGO, Dec. 28—Increases in economy ranging as high as 54 per cent were obtained through the use of the Wilmo manifold in a series of tests recently conducted at Mishawaka, Ind., under supervision of the American Automobile Association. The tests were conducted on a Ford and on a Studebaker Six. An economy run being made first with the regular equipment as furnished by the manufacturer of the car, and then repeated under the same conditions after the stock manifold had been replaced by the Wilmo combination manifold. In each case a measured gallon of fuel was placed in a special testing tank and the car run at average speeds of approximately 20 miles per hour over average city streets until the fuel was exhausted.



Multiple-disk clutch found in the Westcott

The Wilmo manifold is a one-piece gray-iron casting forming a combination intake and exhaust manifold. When it is applied to a motor it replaces the separate intake and exhaust manifolds originally a part of the motor and is applicable to L-head motors. The lower section of the manifold constitutes the intake and the upper section the exhaust. Between these two sections is a thin wall cast integral with the manifold and of the same material. The hot gases passing out through the exhaust section heat the intake mixture which, it is claimed, decreases the gasoline consumption because the heat brings about complete vaporization of the gasoline so that no raw fuel enters the cylinders. It has been found possible to close the needle valve from one-quarter to one-third of a turn after the manifold has been installed. It is also claimed that preignition and carbonization are prevented and that a smooth running motor is given more quickly when starting from cold because only a few explosions are necessary to heat the intake manifold. It is manufactured by the Gillette Motors Co., Mishawaka, Ind., and distributed by the Whittier Co., Chicago.

The test was made under the direct supervision of L. A. Hillman, technical representative of the contest board of the American Automobile Association.

Two tests were performed on each car, one being with commercial gasoline with the manufacturer's manifold equipment, the next with commercial gasoline and the Wilmo manifold. Also the Ford was tested with a mixture of 50 per cent gasoline and 50 per cent kerosene through the Wilmo manifold. The results of the test on the Ford follow:

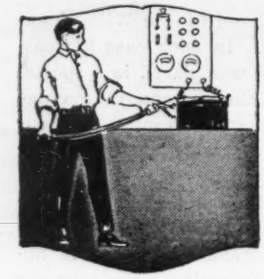
With Ford manifold and gasoline—19.6 miles per gallon.

With Wilmo manifold and gasoline—28 miles per gallon. Increase 42 per cent.

With Wilmo manifold and half gasoline, half kerosene—26.6 miles per gallon.

On the Studebaker Six, with top and windshield up, carrying three passengers and making total weight with load 3570 lbs., the use of the combination manifold showed an increase of 54.7 per cent.

Neither of these cars were new, the Studebaker having been run approximately 7600 miles, and the Ford having run 20,000 miles. The same carbureter was used in both tests, it being a Holley on the Ford and a Schebler model R on the Studebaker. In addition to the economy feature, the Wilmo manifold seemed to make the motor function properly, more quickly than was possible with the regular equipment when started from cold.



Electrical Equipment of the Motor Car

By David Penn Moreton & Darwin S. Hatch.

Editor's Note—Herewith is presented a special installment of a weekly series of articles which began in Motor Age issue of June 29, designed to give the motorist the knowledge necessary to enable him to care for and repair any and all of the electrical features of his car, no matter what make or model it may be. At the conclusion of this series, "Electrical Equipment of the Motor Car," with additions, will be published in book form by the Class Journal Co., in a size to fit the pocket conveniently. It is expected that he book will be published about April 1.

Locating Common Starting and Lighting Troubles

NOTE—This is a special installment of the series published at this time in answer to a number of requests from readers. When this material is published in book form, it will appear in different form in another portion of the work.

AT LEAST 90 per cent of the difficulties encountered in the operation of modern starting and lighting systems are due to one or more of the following causes:

(a) Battery partly or entirely discharged.
(b) Open circuits due to broken connections, etc.
(c) Bad contacts.
(d) Short-circuits.
(e) Grounded circuits.
(f) Improper equipment.

For convenience, the various cases of trouble may be classified as belonging to one or the other of two groups and these may be called lighting troubles and starting troubles.

Lighting Troubles

No Lights, Engine Not Running

This condition is usually due to a discharged battery or an open circuit. The battery may be tested by operating the starting motor, but if the motor fails to operate do not assume that the battery must be discharged as there may be an open in the starting circuit as well as in the lighting circuit. Open the battery compartment and examine the connections to the battery to make sure they are all clean and tight. If no loose connections are found at the battery test it by means of a test lamp or voltmeter, if either is available, or by a hydrometer.

In the absence of a test lamp and voltmeter the approximate condition of charge of the battery may be tested by momentarily short-circuiting it with a short piece of wire or other conductor. If it is completely discharged, practically no spark or arc will form when the short circuit is broken. This method of testing is advised only in an emergency. Should the battery be found discharged it may be due to any one or a combination of the following causes and the trouble should be located and corrected.

(a) Short circuits in the wiring, lamps, switches, and other equipment.
(b) Battery worn out, internal short circuit, low electrolyte, excessive lamp load, improper use of starting motor, partial short-circuit caused by acid and moisture on top of battery, etc.
(c) Cut-out not operating properly and as a result the battery discharges through the generator.

If the condition of the battery is found to be correct, then the trouble is doubtless due to an open circuit. An inspection of the circuit may locate the trouble which may be due to a terminal coming loose, a terminal block or switch open, blown fuse, loose wires in lamp sockets, burned out lamps, broken wire, lamps loose in sockets, defective switch, and so forth. If the open circuit is not readily located by an inspection of the circuit it may be found by testing, as explained in one of the following sections.

No Lights, Engine Running

If no lights burn when the engine is running, the cause of the trouble may be any one or a combination of the following:

(a) Circuits connected to the battery short-circuited, which also short-circuits the generator.
(b) Open circuit between battery and lights as explained above, or an open circuit between the generator and battery.
(c) No voltage generated by the generator, which may be due to dirty or roughened commutator, brushes stuck in holders and not in contact with the commutator, brushes not fitted to surface of commutator, no pressure on brushes so as to hold them on the commutator, winding burned out or grounded, short-circuited or grounded field coils, etc.
(d) The cut-out and regulator may not be operating due to improper adjustment, burnt-out winding, broken connections, dirty contacts, worn-out contacts, etc.

One or More Lights Out, Others Bright

If one or more of the lamps do not light when turned on, but others do light the trouble is due probably to:

(a) Fuse blown.
(b) Bulb burned out.
(c) Bulb loose in socket.
(d) Open or ground in wire to lamp from switch.
(e) Switch does not close.

First try the bulb by making sure it is firm in its socket and then inserting it in a socket to replace a lamp that is burning. If it does not light, the bulb must be renewed; if it does light the trouble is between the switch and the socket. Then look to the fuse. If it is correct, the trouble is between fuse block and socket and can be located by inspection for grounds or open circuits or tested as explained later.

Dim and Flickering Lights

If all the lights are dim when the engine is not running, the cause is a partly discharged battery.

If all the lights are dim when the engine is running, the cause is a partly discharged battery, or the cut-out, regulator or generator are not operating correctly.

When one or more, but not all, lamps flicker, the cause of the trouble may be due to loose connection in the lamp circuit, broken filament or the cut-out may not be operating properly.

When some lights are dim and others of supposedly the same candlepower are bright the cause of the trouble may be a poor

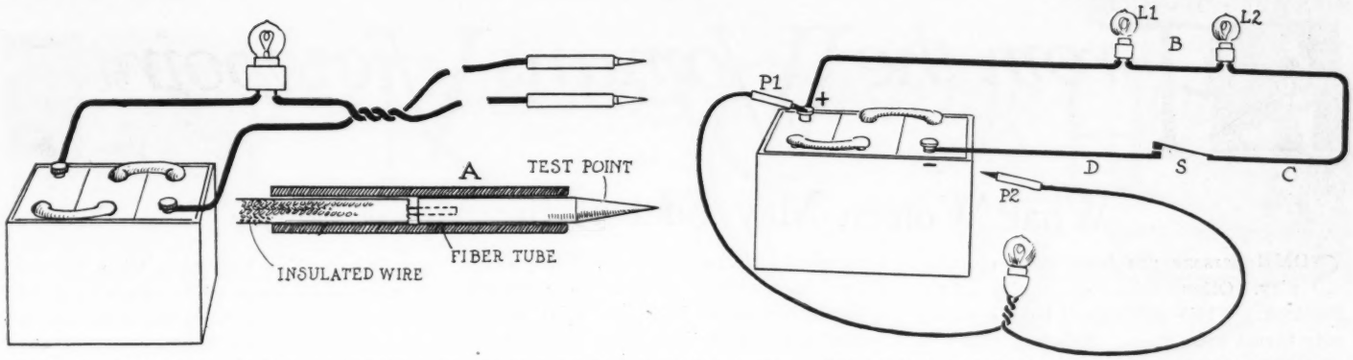


Fig. 1—At the left, a test lamp and battery for locating troubles in electric system. The battery in the car usually can be used without removing it from the car. The detail shows a special test point that can be made for repair shop use where frequent testing is necessary. For the motorist, a length of lamp cord usually will serve. Fig. 2—At the right, using a test lamp for locating troubles in a series lighting circuit

bulb, or one of improper voltage, blackened or worn out bulb, partial short circuit on some part of the lighting circuit.

Starting Troubles

Starting Motor Does Not Crank Engine

If the starting motor refuses to operate when the starting switch is closed, the trouble is likely due to one of the following causes:

(a) Discharged battery, which may be determined as explained above.

(b) Open circuits due to loose connections at battery, starting switch, motor terminals or ground connection; very poor contact in starting switch; dirty or roughened commutator; worn brushes; brushes not fitted to the surface of the commutator; improper pressure on the brushes; armature or field winding burnt out.

(c) Short circuits or grounds in starting switch, wiring or motor, due to insulation being worn off of the conductors by metal cleats, sharp bends around the metal covers, insulation destroyed by heat, water and grease, etc.

Starting Motor Cranks Engine Slowly

When the starting motor cranks the engine below the proper speed, it may be due to any one of the following causes:

(a) Battery partly discharged or very cold, thus lowering its efficiency.

(b) Poor contacts in motor circuit, usually at battery terminals, starting switch, contacts, or the commutator of the motor. In fact any condition which will not result in an abnormal amount of resistance being introduced into the circuit.

Simple Testing Equipment

A 6-volt lamp in a small socket and provided with testing points corrected to it by means of lamp cord may be used in locating practically all kinds of trouble on a starting and lighting system when the operator is familiar with the wiring diagram of the system or has at his disposal a diagram which he can readily follow. For repair-shop use the test points may be made similar to the ones shown in Fig. 1. For emergency use, any two lengths of wire with bared end usually will serve.

How to Locate an Open Circuit

The use of the test points in locating an open circuit may be shown by taking the circuit shown in Fig. 2. Assuming you are going to use the battery in the car in making the tests you may proceed as follows: Connect one test point to the positive terminal of the battery and the other point to the negative terminal. With these connections made the test lamp should light up to its full candlepower unless the battery is in a discharged condition. Assuming the battery is found to be properly charged move the test point from the negative terminal of the battery to the terminal of the switch where the wire D is connected, and if the lamp lights the wire D is O. K. Next move the test point P2 to the terminal of the switch where the wire C is connected and if the lamp lights with the switch closed, the switch is O.K. Next move the test point P2 to the right-hand terminal of lamp L2 and if the test lamp burns the wire C is O.K. Next move the test point P2 to the left-hand terminal of the lamp L2. When this last connection is made the test lamp and lamp L2 will be connected in series across the terminals of the battery. If lamp L2 is O.K. the filament of the test lamp will brighten up but not to the same extent it did when connected to the right-hand terminal of the lamp. Next move the test point P2 to the right-hand terminal of lamp L1 and if the test lamp glows the same as when the test point P2 was connected to the left-hand terminal of lamp L2 then wire B is O.K. Lamp L1 may be tested by moving the test point P2 to the left-hand terminal of the lamp which puts the lamps L1 and L2 both in series with the test lamp and the test lamp may not light at all due to the added resistance in series with it. Lamp L1 and wire A may be tested by placing the test point P2 on the negative terminal of the battery and the test point P1 on the left-hand terminal of the lamp L1 and if the test lamp lights wire A is O.K. Then move the test point P1 to the right-hand side of the Lamp L1, which places the test lamp and the lamp L1 in series and if the lamp L1 is O.K. the test lamp will light, but not at full voltage due to the resistance of lamp L1 in series with it. Should the test lamp fail to light under any of the above conditions, it is an indication that there is an open circuit between the last point where the test lamp would light and the first point along the circuit where it failed to light.

Testing for Short-Circuits

Short circuits between two wires which are normally insulated from each other may be tested for with the test lamp and battery shown in Fig. 1, by placing one test point in contact with one of the wires and the other test point in contact with the other wire. If the test lamp lights it is an indication that the two wires being tested are electrically connected or shorted. In making this test be sure that the wire or circuits being tested are not normally connected. This may be determined by a thorough inspection of the wiring diagram.

NEXT WEEK

Another Special Installment Giving Practical Applications of These Methods of Testing as Applied to Several of the Common Systems

From the Woman's Viewpoint

What Women May Find at the Motor Show

SOME persons are born with opportunity. Others seize opportunity by the forelock. While still others have opportunity thrust upon them. This last might be an apt way to put the case of the prospective car buyer at the motor show. For nowhere else does the dealer or maker find himself in such exacting competition with hundreds of others at the same time and same place.

It may not be a case of now-or-never for you to attend the shows, but if you do not attend them, you will be overlooking the best opportunity you may have to learn something of cars before choosing your own or even after choosing your own, when you are ready and eager to acquire new knowledge. This applies more, perhaps, to the prospect than to any other attache of the show. The prospect is a person of leisure with "I don't like this" and "Why doesn't it do this?" not only permitted but listened to with respect and answered with the conviction of the worth a particular make may possess.

No doubt you would find it confusing to try to sample all the information at the show, but if you have in mind a certain make or if a model on exhibit promises satisfaction, you will have opportunity to know it before you are committed to buy. Choosing is simple when you keep a few points in mind and no woman need bear out the tradition that a pretty coat of paint makes up for a balky engine if she selects with other considerations in mind.

Should Have Thorough Demonstration

The safest way is to get a good, all-around demonstration of the car before buying, and if you are buying for your own driving it would be well to determine just what comfort the driver's seat, levers and so on will give you. Get into the driver's seat and experiment to see whether you can reach the levers easily. Try the brakes. Work the clutch. See how much strength they take, and if they take a very large portion of your total strength look further. For you will never be able to get the pleasure due you from your own car if you have to work too hard to run it.

It wouldn't be a bad idea to see if you could change a tire, to take it off and put it on at least, and a good time to try it would be when you have a competent instructor to direct you. You usually have that kind when you are buying a car, but you more often have the free advice that gets nowhere when you try changing a tire for the first time out on the road, alone.

Let the salesman ramble on about the speed and the high gear success if you have plenty of time. But don't stop there. Have him show you some of these remarkable performances in actual trial on the straightaway and hill. Find out whether you'll be risking your neck when your car is stopped or stops while climbing a hill. If you want speed have the demonstrator do the stepping on the accelerator first. Learn how flexible the car is in traffic such as might be encountered in ordinary driving.

Upkeep should be considered in selecting. The car that is the best you can buy is not always the one for which you can pay the most cash. The ultra-extra lines and finish of a car may please you more than the super-engine, but any admonition as to the superfluity of exterior appearance alone is itself superfluous. Any discriminating woman can select a good exterior if the chassis is given, or scorn one if the chassis is lacking in some essential mechanical feature. Anyway the maker today gives so much thought to the exterior that it would have to be a very poor car to have a very poor exterior.

Noisy Engine Means Trouble

Women, perhaps, are the first to prefer a quiet, smooth-running motor and for this reason are apt to pick out a car with a well-made and well-designed motor if proper demonstration is made. A noisy engine is avoided with poetic justice, for it is an imperfect engine. Have the motor run at different speeds, even if the car is standing. If the car vibrates very much, the motor probably is imperfect. The more it vibrates the quicker it wears itself out.

Accessibility undoubtedly is one thing the woman should look for, especially if she expects to be able to tinker with the inwards of her car. Many other things could be put before the woman who seeks her car. She will have countless other things put before her if she attend the motor show. Any point looking toward greater safety, comfort and pleasure should be heeded particularly, for to accomplish the end of motoring safety, comfort and pleasure are fundamentals. The engine, the body in general, the brakes, the gear levers, the clutch, the lighting and signaling system—all these are points the woman can consider and consider effectively in choosing a car.

Unless she is of a mechanical turn of mind she will not go much further in regard to the general technique of the motor car, but these are matters that all who pretend to drive a car should know before buying even. When she comes to learn to drive, that is another question and one involving consideration of other parts of the car, such as the transmission, universal, steering gear, throttle and spark and other more detailed points.

Feminine Motor Notes

SAINT LUCIE County Federation, an organization of Florida women, has decided to offer to raise and present, free of cost to the county, all the trees and ornamental shrubs needed for planting along the Dixie highway in the county. Only three of the clubs represented in the federation are on the highway, but all are working for the project. The red, white and blue colors of the highway are to be embodied as far as possible in the plants. Each club has pledged itself to a share of the mileage. The women will give the material; the county will do the planting and watering.

The Woman's Auxiliary of Bibb County, Macon, Ga., has planned a toll day, at which time they will try to find out just how many persons actually use the roads of the county in one day. The plan is a part of the good roads activities of the organization.

Where is your blanket now? It has been suggested that Northwestern women who motor have been using the scissors recklessly on the family blankets since the motor coat made of the new blanket cloth in white with wide stripes has come into vogue. The stripes come in yellow, gray, red, brown and blue and are very popular.

Miss Laura K. Kennedy has charge of the county headquarters in the Chicago offices of the Associated Roads Organizations of Chicago and Cook County and the Illinois Highway Improvement Association, which were opened lately. Miss Kennedy was the first woman in Illinois to assist at a good roads dedication, which was at Highland Park in 1914, when part of Sheridan road was opened. She will try to obtain the support of Illinois women in good roads activities.

Another in-spite-of-the-winter-season trip was made recently by two Detroit women, Mrs. W. G. Smith and Miss Margaret Easton, from New York to Detroit. Miss Easton herself drove the car, her own, part of the way. The drive was made in snowstorms with rough going along part of the route with no mechanical troubles.

The Readers' Clearing House

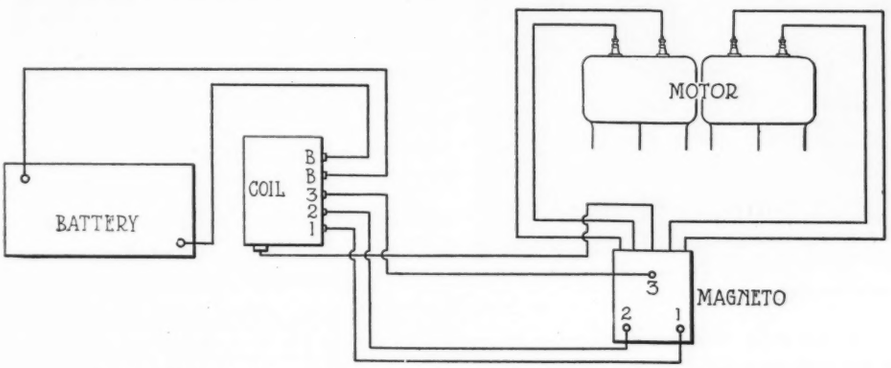


Fig. 1—Wiring diagram showing Briggs magneto installation on Michigan four-cylinder car

ENGINEERING SOCIETY BENEFITS

List of Qualifications Necessary to Become Member of S. A. E.

AUGUSTA, Wis.—Editor MOTOR AGE—Kindly give me some information as to the qualifications necessary to become a member of the Society of Automobile Engineers, and what are the benefits?—George E. Wamer.

The membership of the society consists of honorary members, members, associate members, punior members, affiliate, student and international members. Honorary members and members are entitled to vote and hold office. Asociate, junior, affiliate and international members shall not be entitled to vote nor to be officers of the society but shall be entitled to the other privileges of membership.

The member grade, which is of course the greatest, is composed of persons 26 years of age or over who, by previous technical training or experience or by present occupation are qualified to act as designers or constructors of complete motor vehicles or the component parts or equipment thereof; or to exercise technical supervision of the production of materials of engineering construction; or to take responsible charge of motor car engineering work, or to impart technical instruction in motor vehicle construction and operation.

The associate grade is composed of persons 26 years of age or over who are engaged in the motor car and related industries in a responsible commercial or financial capacity or who are connected with the motor car or related industries as to be competent to co-operate with motor car engineers.

For all grades it is necessary to give a prescribed number of references among present society members and the candidate is passeed upon by the membership committee.

The benefits to those who are seriously interested in the engineering phase of the motor car industry are manifold. The society has sections in localities where the industry is well represented and these sections have monthly meetings at which technical papers are delivered by the best engineering authorities in the industry. These papers are published in the monthly S. A. E. Bulletin. There is a fraternalism and exchange of ideas which passes through an organization of this kind which has an immense effect in the development of the mechanical features of motor cars, and no engineer can expect to keep thoroughly posted on the most modern ideas and trends unless he be a member.

REBUILT FORD USED IN RACING

Stubby Job of Light Weight Is Said to Be Capable of 72 m.p.h.

Hope, Idaho—Editor MOTOR AGE—I inclose picture of myself in a one-time Ford, Fig. 4, which I rebuilt myself and have campaigned in southern Idaho and Missouri. This car has attained a speed of 72 m.p.h. on a straightaway. The motor is equipped with Lynite pistons, speed camshaft, Bosch magneto and Rayfield carbureter. The wheelbase is 76 in. and the tires are 30 by 3 all around. The frame is underslung in the rear and the whole frame has been lowered 4 in. The gear ratio is 3 to 1.

1—What is gained by narrowing the tread of a racer?

2—What percentage of power is lost through a gearset of the sliding gear type when it is in high gear?

3—What makes of gearset are manufactured that do not turn the countershaft when in high gear?

4—At what distance from the center of the crankshaft is the center of gravity in the Ford motor?

5—Where can I purchase a counterbalanced crankshaft for a Ford motor?

6—What companies manufacture overhead-valve heads for Fords?

7—After removing the magnets from the flywheel is it necessary to put cups on to let the oil into the oil tube?

1—No racers which have made creditable showings for a number of seasons have very narrow tread. Therefore, it is reasonable to assume that there is no advantage in reducing the width much from standard.

2—Depending on the bearings. If the bearings are of the ball or roller types and everything is in proper adjustment the frictional resistance is practically negligible. Even with solid bearings this factor would not approach a 5 per cent power loss.

3—Answered by letter.

4—It is impossible to extract technical information of this nature from the Ford factory.

5—We have nothing in our records that shows a maker of such a part.

6—T. R. Noonan Mfg. Co., Paris, Ill.

7—We have seen instances where there was nothing inserted and the oiling seemed to be conducted as good as ever. We would venture to say, however, that it would be safer to use some kind of dippers in place of the removed magnets.

Alloy Pistons in Fords

Anita, Ia.—Editor MOTOR AGE—Are aluminum-alloy pistons and connecting rods a success in a Ford? Will they stand up? There are no babbit or bronze bushings in the pistons or connecting rods?—F. Rhoads.

Aluminum-alloy pistons are successful in any make of car providing they are properly fitted and are of such construc-

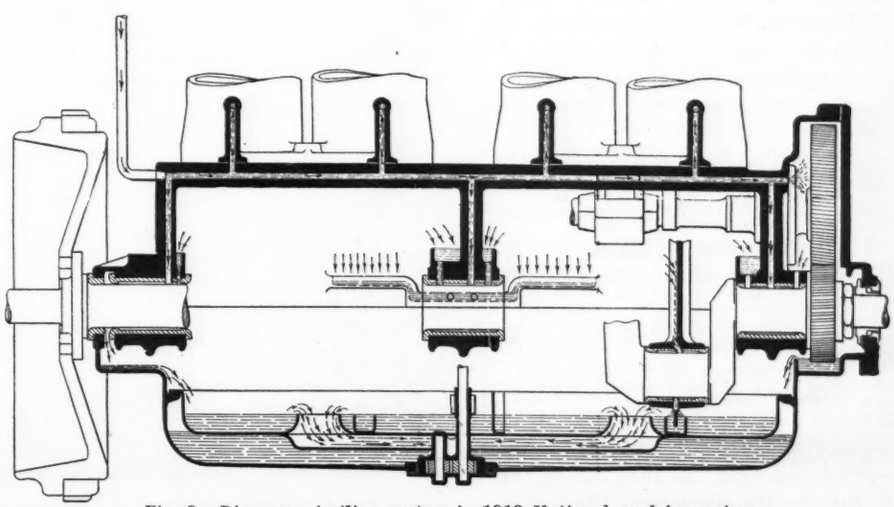


Fig. 2—Diagram of oiling system in 1913 National roadster motor

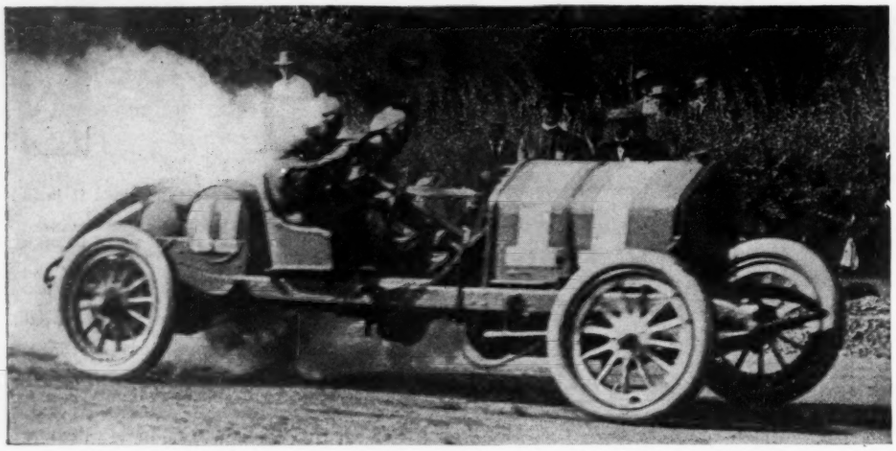


Fig. 3—Herricks national racer which won 1912 Santa Monica race

tion as to meet the peculiar requirements demanded by this type of piston. As to the alloy connecting rods it is even more important that one know the construction is so reinforced as to stand the terrific strains which are imposed upon these parts. The Ford connecting rods are of very light-weight construction. Why change? Aluminum presents a good bearing surface.

HIS HYBRID SPEEDSTER VIBRATES
Probably Motor Is Not Properly Balanced and Has a Vibration Speed

Chicago—Editor MOTOR AGE—A friend of mine recently built a speedster consisting of a special chassis, 30-in. tires, transmission in gear with ratio of 3⅞ to 1. On this frame is mounted a 4¼ by 5¼ T-head motor—a Garford, I believe—Bosch magneto, Rayfield carbureter, the complete car weighing 2,000 lbs.

Everything goes well up to a speed of 20 to 25 miles; beyond that there is a good deal of vibration, noise and consequent high gas consumption; the best speed being about 40 m.p.h. The car will climb a 10 percent grade on high at a 3-mile clip, showing plenty of power. Considering size of engine and tires the gear ratio, I think, is too high. Could MOTOR AGE advise me as to the proper ratio? Would a reduction perceptibly impair the ease with which the car can now be handled at low speeds on high gear?—J. C. Ehlarik.

Undoubtedly this old four-cylinder motor is not properly balanced mechanically so that its vibration speed occurs when the car is traveling about 20 to 25 m.p.h. The gear ratio is not high for a motor of this size and design. If the ratio were changed say to 3 to 1 then the motor would begin to vibrate at a speed slightly higher than it does now, but it would vibrate nevertheless and probably always will. As far as power is concerned though, there is no reason why the motor would not handle a 3 to 1 gearing, although the idling speed would of course be somewhat higher than with the present gearing.

Oversize Tires on Dodge

Clarksville, Tenn.—Editor MOTOR AGE—Would it be economy to equip a 1915 Dodge with oversize tires?

2—Does MOTOR AGE think it wise to use graphite in the transmission and differential greases?

3—What companies in this country are manufacturing Knight motored cars? Give addresses.—Josiah Fort.

1—Yes.

2—Yes.

3—Willys-Overland Co., Inc., Toledo, O.; F. B. Stearns Co., Cleveland, Ohio; Moline Automobile Co., East Moline, Ill.; Finley Robertson Porter Co., Port Jefferson, N. Y.

READER BUILDING AN AIR WAGON
Maximum Speed Is a Factor to Be Determined Only by Experimentation

Pulaski, Ia.—Editor MOTOR AGE—I am building a four-wheeled contrivance which is to be driven by a propellor. Weight, complete, 360 lb. What should be the length, width and pitch of the propellor blades?

2—Would spruce be suitable for the propellor, and what should be the speed of the propellor?

3—What should be the speed of the machine under favorable conditions with a 9-h.p., high-speed, twin-cylinder motor?—A Subscriber.

1—A 9-hp. motor should drive a 4-ft. propeller with a 4-in. pitch and 6 to 8-in. width at the widest part.

2—Yes. The speed is a thing to be experimented with to see what will give the best results. On the first trial we would suggest a 2 to 1 gearing, that is, the propeller to travel 2 revolutions to the motor's 1.

3—Anywhere from 40 to 60 m.p.h. should be possible, depending to a great extent on the construction of the machine, power of the motor, etc. The mere statement that the motor is one of 9 hp. does not give us much idea of its real ability.

Communications Received and Inquiries Answered

George E. Wamer.....Augusta, Wis.
A Reader.....Hope, Idaho
F. Rhoads.....Anita, Iowa
J. C. Ehlarik.....Chicago
A Subscriber.....Pulaski, Iowa
Josiah Fort.....Clarksville, Tenn.
W. E. McKee.....Montezuma, Iowa
P. L. Campbell.....Goliard, Tex.
W. N. Damon.....Taft, Cal.
K. N. D.....Muncie, Ind.
Paul Rayman.....Brookston, Ind.
D. E. Morron.....Minneapolis, Minn.

No communication not signed by the inquirer's full name and address will be answered in this department.

HUDSON-HAYNES POWER CURVES
No Curve for Mitchell, but Figures of Performance Are Given

Montezuma, Ia.—Editor MOTOR AGE—Kindly give me power curve of the 1915 Hudson 6-40, 3½ by 5; the 3½ by 5 six-cylinder Mitchell, and the 3½ by 5-in. Haynes.—W. E. McKee.

A curve showing the relation of car speed to engine speed in the Hudson 6-40 equipped with 34 by 4 tires is shown in Fig. 5. A power curve showing the motor performance of the 3½ by 5 Haynes is shown in Fig. 6. There is no complete power curve for the Mitchell available. However, the following points may answer: The maximum r.p.m. of this motor is 3500 and the maximum horsepower is 55; the motor's maximum efficiency is attained at about 900 r.p.m., equalling a car speed of about 20 m.p.h.

Briggs Magneto on Michigan

Andrews, Tex.—Editor MOTOR AGE—Give a wiring diagram of the Briggs magneto used on the Michigan four-cylinder models. I think it is a 1915 model or 4-90.

I understand that this concern is out of business. If they went out previous to 1915, give the above information for their last models.—E. R. Dunn.

The wiring of the Briggs ignition system in the four-cylinder Michigan cars is shown in Fig. 1. This is for the latest Michigan four-cylinder model which was fitted with this system.

Alcohol Solution for Texas

Goliad, Tex.—Editor MOTOR AGE—I have noticed from time to time in these pages formulas for non-freezing solutions to be used in the radiator, but all of them seem to be in-

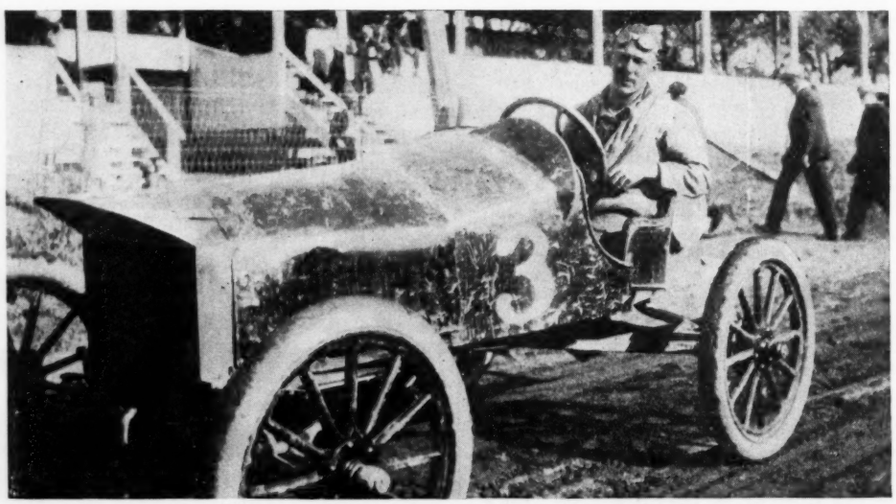


Fig. 4—Stubby reconstructed Ford, which has a claimed speed of 72 m.p.h.

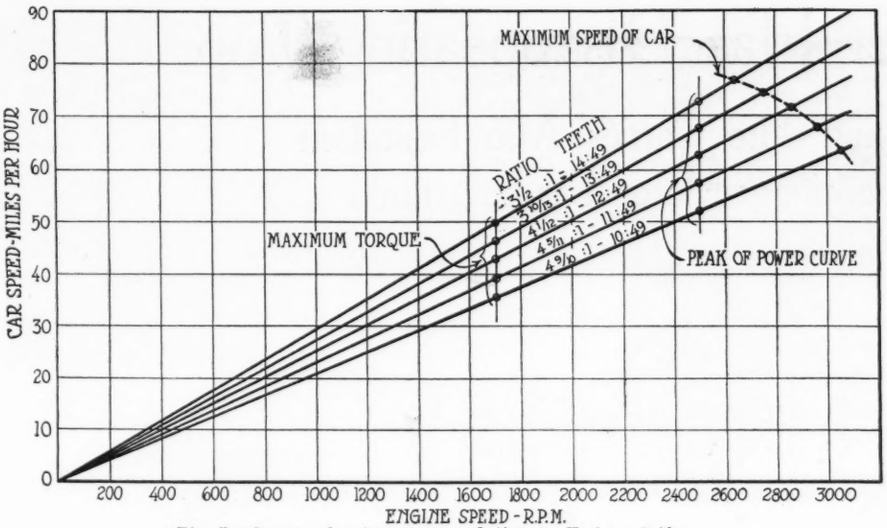

MAXIMUM SPEED OF CAR
MAXIMUM TORQUE
PEAK OF POWER CURVE
RATIO TEETH
3½ :1 - 14:49
3 10/13 :1 - 13:49
4 1/12 :1 - 12:49
4 5/11 :1 - 11:49
4 9/10 :1 - 10:49
CAR SPEED-MILES PER HOUR
ENGINE SPEED - R.P.M.

Fig. 5—Curves showing power relation in Hudson 6-40

tended for colder climates than south Texas. I believe that down here a more economical mixture of alcohol and water can be used.

We never have weather colder than 20 degrees above zero, which is 12 degrees below freezing point. What is the smallest proportion of alcohol to water that can be used and not freeze at 20 degrees above zero, also at 10 degrees above zero?—P. L. Campbell.

A solution of 10 per cent alcohol and 90 per cent water should give you all the protection necessary in the climate you live in, even to a temperature as low as 10 degrees above zero.

INTERSTATE ENGINE OVERHEATS

List Given of Most Common of Numerous Troubles Which Cause This

Muncie, Ind.—Editor MOTOR AGE—I have a 1916 Inter-State which has a tendency to heat. It is equipped with a Junior model Boyce Moto-Meter and after running for 1 mile or so, even when the temperature is only slightly above freezing, the red line rises to about ⅛ or ¼ in. above the top line of the space marked "summer average." When I kill the engine, after running a short distance, the water makes a bubbling noise. This is not the result of boiling, for when I remove the radiator cap no steam rises nor is the water bubbling. What is the cause?—K. N. D.

The causes of overheating motors are indeed numerous. We will give the most common ones: Cylinders, pistons and rings dirty with carbon, carbureter mixture too rich, spark timed too early, valves adjusted too loosely, clog in the water system, etc. You should go over all of these adjustments and then flush out the water system with a weak solution of lye. Motor and cooling system cleanliness have a lot to do with keeping the motor cool.

SPARK PLUG PORCELAINS BREAK

Mysterious Trouble May Be Due to Dirty Motor Interior

Brookston, Ind.—Editor MOTOR AGE—I have an Empire which was purchased about 1½ yrs. ago, in which I cannot keep spark plugs. The trouble is, the porcelain breaks and I cannot find a man who can tell me what is causing this trouble. I have paid from 35 cents to $1.50 for plugs, but it breaks the high priced ones as quickly as the cheap ones. About 200 miles is the very best I can get out of a $1.50 plug. The motor does not get hot while the plugs are good, but when one goes wrong, it gets hot. This is a four-cylinder car having a 12-volt generator on battery. One man told me it was the heat, so he sold me regular motorcycle plugs and they did not hold. The first summer we drove it we did not have any spark plug trouble at all. I cannot see anything wrong with the car. It runs fine

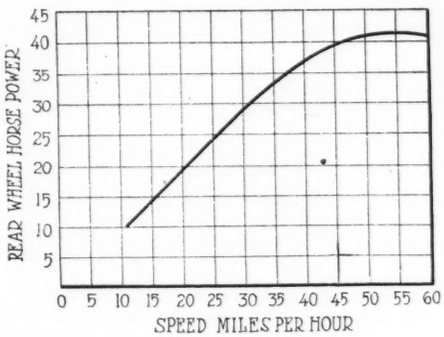


Fig. 6—Power curve showing performance of Haynes 3½ by 5 motor

while the plugs last. The generator has never been looked at on the inside.—Paul Rayman.

This seems to be an unusual trouble in this model; in fact investigations are to the effect that the trouble has never been reported at the factory before. The only way we can account for it, basing our judgment on the description that you give, is excessive heat in the motor due to carbon deposit.

NO ACCURATE POWER COMPARISON

Theoretically Two Cars Described Should Perform Very Much the Same

Minneapolis, Minn.—Editor Motor Age—I drive two cars and would like to know which one should develop the most power, and how much more. The specifications are as follows:

No. 1—Twelve-cylinders 3x5; piston displacement 424 cubic inches; gear ratio 4.35 to 1.
Tires 36x4½ front, 37x5 rear.
Weight 4,300 pounds.

No. 2—Six-cylinders 3⅞x5; piston displacement 353 cubic inches; gear ratio 3.7 to 1.
Tires 34x4 front and rear.
Weight 2,900 pounds.—D. E. Morron.

Theoretically the two cars should perform very much the same, although in practice there is no possibility of comparing two cars from specifications, so great is the influence of variance in design. The larger car has approximately 1.2 more power to pull approximately 1.5 more weight, which it is assisted in doing by a gearing which is about 1.1 lower.

Herrick's National Racer

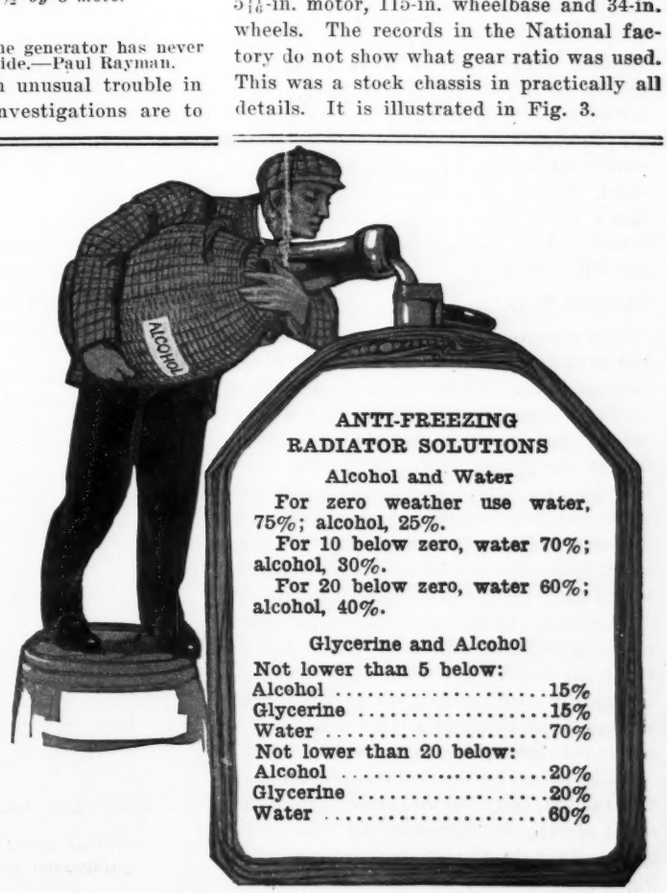
Taft, Cal.—Editor MOTOR AGE—Give a diagram of the oiling system on the 1913 Model 40 National speedster.

2—Give specifications and illustration of the National racer with which Harvey Herrick won the 1912 Vanderbilt cup race at Santa Monica.—W. N. Damon.

1—The diagram of the oiling system is shown in Fig. 2.

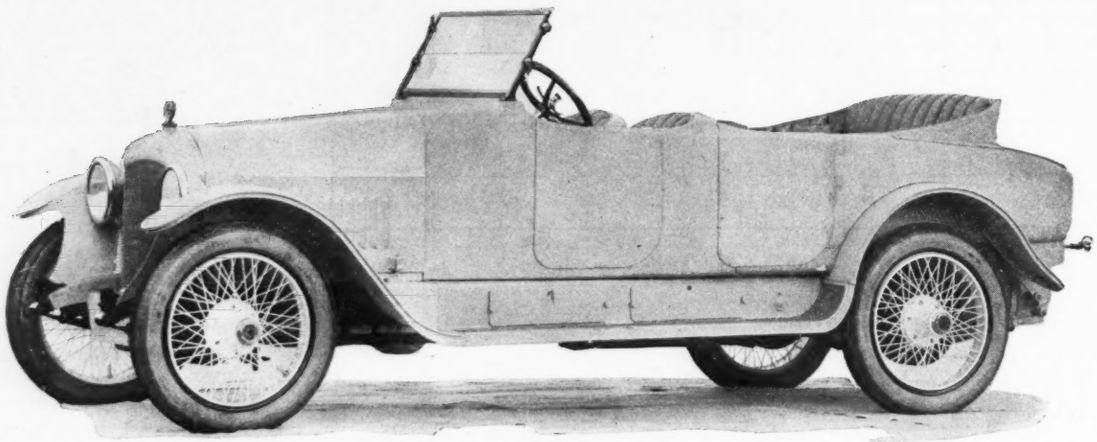
2—This car had a four-cylinder, 5 by 5 11/16-in. motor, 115-in. wheelbase and 34-in. wheels. The records in the National factory do not show what gear ratio was used. This was a stock chassis in practically all details. It is illustrated in Fig. 3.

Kerosene or Salts Should Not Be Put In the Radiator. Use Alcohol and Glycerine.



Pathfinder Has Disappearing Top

Telescoping Tire Carrier Also Found in Extraordinary Motor Car Innovation



The new Pathfinder body is distinctly yacht-shaped. This view gives a good idea of the clean appearance given the car when the top is lowered into the rear compartment

A DISAPPEARING top and one of the cleverest tire carriers yet devised mark the new Pathfinder as the latest and greatest surprise in the motor car building industry. These features are not all that are new in this offering of the Pathfinder Motor Car Co., Indianapolis, Ind. There is an entirely new frame which has such rigidity that vigorous tests show practically no movement in the doors, a matter of $\frac{1}{64}$-in. maximum. The seats are new all the way around. The regular seats are compound spring suspended and are true shock absorbers in themselves. The auxiliary seats are mounted direct to the frame and are assembled with the chassis, not with the body.

Gasoline Tank in Cowl

The gasoline tank has been placed in the cowl for good reasons that will be explained later. Wherever one part can be used for two purposes there is provision made. For instance, the rear cross member of the frame serves as a heel board for the rear seat. The frame itself supports the floor boards. There is no substructure. Thus the seats may be made lower with the same allowance between the top of the cushions and the floor boards.

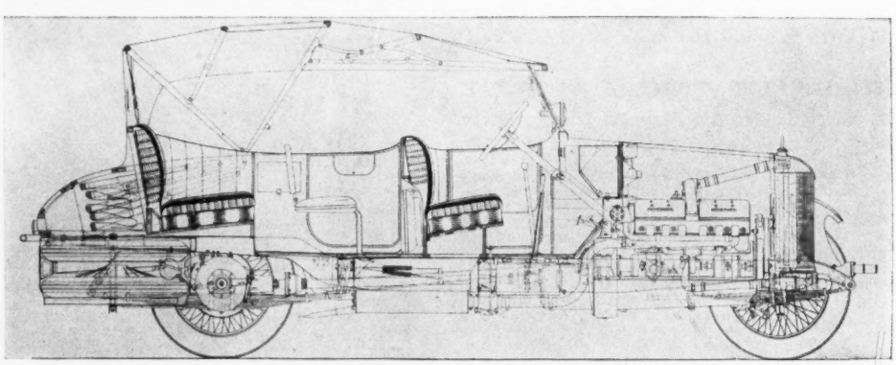
The body is the sectional type being made up in two main units which join at the front doors. The brakes have been increased in size. Minor parts have been strengthened to make a very equally proportioned rigidity in the entire job.

Quite naturally one is first interested in the radical body of this new model. In every detail the shape is the true yacht type. Even in the seven-passenger touring model, roadster lines are observed, the stern being turtle-backed behind the rear seat. This turtle back serves as a compartment for the top. We will assume that the top is up. To lower it the driver first opens the main door on the back of the deck and two small flap doors on the sides of the rear seat. The supports are then loosened at the windshield, the top is carried back by the operator walking between the divided front seats and dropped into the rear compartment. The three doors are closed and the top entirely disappears. A little nicety of detail is an eave trough in front of the hinge of the door which covers the top. This eave is drained through pipes and any water which may collect passes through these pipes to the ground. The top is thus kept perfectly dry in its compartment and a boot is naturally superfluous.

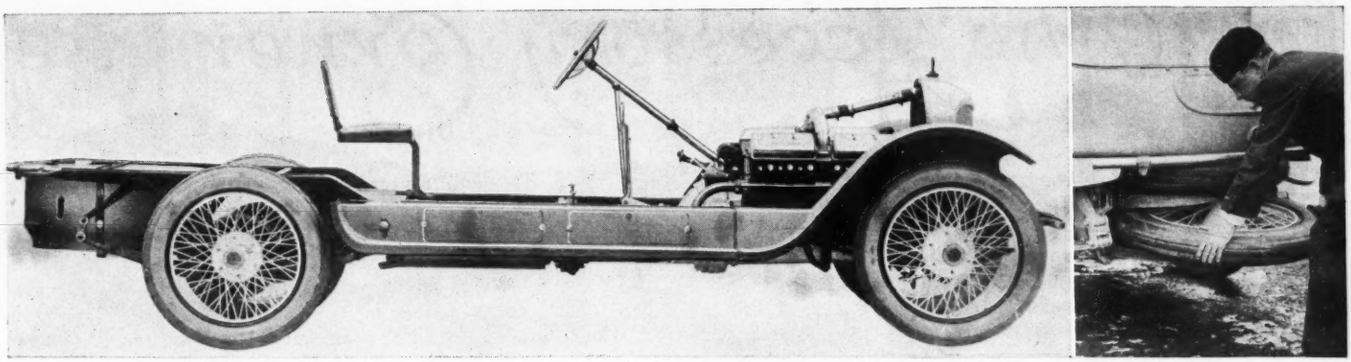
Directly under the top compartment and supported between the overhanging side members of the frame is the new tire carrier. This is a compartment made of two semi-circular halves, one telescoping axially into the other. The compartment contains two shelves into which the tires are laid horizontally with the ground. The back half of the compartment is then revolved, completely inclosing the tires. It is quite obvious that this arrangement is unusually convenient. Instead of lifting 90 lb. tires and rims onto a rear carrier and strapping them fast, a job which requires no small amount of physical exertion, they are boosted a matter of a foot or so off the ground and slid onto the shelves and locked out of sight.

Concealing the top and tires gives a perfectly clean exterior, there being a smooth sweep from the characteristic Pathfinder V radiator to the tail light. This tail light, too, is not an attached accessory but is built into the body.

Outside of the front and rear bumpers which are attached to the front and rear



General layout of the new seven-passenger Pathfinder showing new seats with double springs, top and tire-carrying compartments, floor boards on the frame itself and the cowl location of the gasoline tank



The auxiliary seats in the new Pathfinder are supported on the frame and are assembled with the chassis. The tire compartment opened showing shelves for two tires

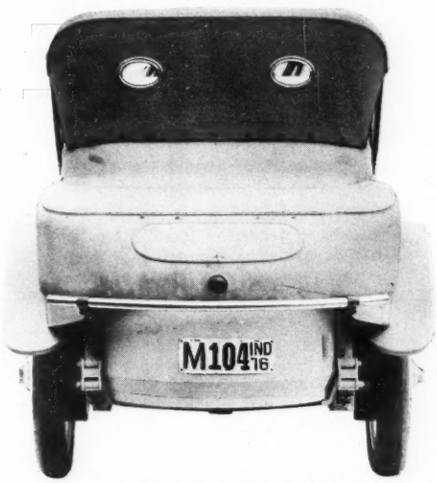
of the frame, the front lamps and the windshield and spot light, there are no attached accessories visible on the outside of the body.

The rear-frame construction is unusual in that the spring hanger is located at a considerable distance from the end and is a drop-forging riveted to the bottom of the cross member. The extension beyond this serves as a support for the top carrying compartment and resultantly the rear of the body, a carrier for the tire compartment and the two ends, hollow, take the rear bumper which conforms with the rounded rear end. As previously stated the rear cross members also serve as a heel board for the rear seat. The front cross member is a girder giving solid support to both the top and bottom and the deep-sectioned side members. There is a much greater flare in the frame than in the former models giving direct support underneath the body sides.

Considerations for Comfort

In matters of comfort for the passengers it appears that there has been nothing neglected. The cushions are suspended in a set of main coil springs, hour-glass shaped, and a set of light coil springs above over which is a light padding and then the leather upholstery. This combination gives a floating, non-rebounding action which irons out the small shocks in a surprising way. There is a cutout provided. As a little touch for the convenience of the driver the tools are segregated into compartments where they are easy to get at. Each tool is firmly supported in its individual carrier and tools for various jobs are in different places. If there is a tire to be changed the tools are all together for this job in their particular compartment. A spotlight is regular equipment.

The gasoline tank has been moved from the rear to the cowl primarily because all



The top compartment and tire-carrying box as they appear from the rear

available space in the rear is taken up with the tire carrier. Nevertheless, the designers of this car advance the statement that there are many advantages favoring this location such as simplicity, elimination of parts, short pipe lines, a gasoline gage on the instrument board and sidewalk filling, instead of the need of stepping into the mud. The filler is under the hood where splash will do no harm. It is argued that a filler in the passenger compartment is hard to get at and any slop either falls onto the passengers themselves or under their feet onto the floor.

There are seven locks on the new Pathfinders, all controlled by one key which is changed in every twenty-five cars. The hood is fitted with a lock on both sides. The tool compartments have locks, the tire carrier has a lock. The ignition has a lock. Pathfinder is campaigning to protect its owners from the industry of theft which is so constantly increasing.

The new radiator, although maintaining the Pathfinder shape, is now the shell and core type. It is supported on an individual cross member in a way that does not permit transmission of twisting tendencies to the radiator.

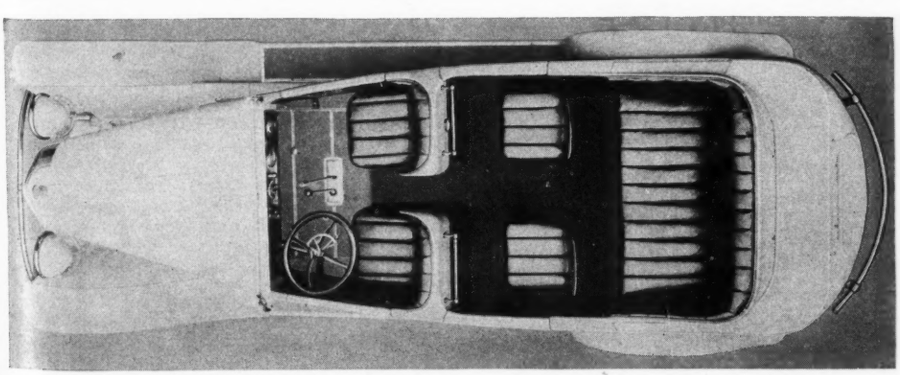
Thermostat in Cooling System

In the cooling system a thermostat is located between the radiator core and the water pump. It automatically maintains an even temperature in the motor under different atmospheric conditions by either by-passing the water back of the radiator or letting it go through the core.

As heretofore stated the powerplant remains unchanged. For those who are not familiar with the Pathfinder motor, it is a twelve-cylinder V-type with a 2⅞-in. bore and 5-in. stroke. The valves are in the head. The cylinders are, of course, cast in blocks of six and the right set of six is placed ahead of the left to permit the placing of the connecting-rod bearings side by side. A pressure pump furnishes lubricant. The carbureter is the latest type Stromberg instrument. Cooling is effected by a centrifugal pump in connection with the thermostat and new radiator previously mentioned.

Ignition, starting and lighting are cared for by a Delco two-unit installation. The battery is a Willard.

In the equipment may be found a Boyce Moto-Meter, headlamps with two sets of bulbs, motor-driven horn with a button located in the center of the steering post, Silvertown Cord tires, 35 by 5 straight side, speedometer, electric clock, etc.



Seating arrangement in seven-passenger Pathfinder. The arrangement of the bumpers is shown. These are standard equipment

The Accessory Corner

To Lengthen Accessory Life

A PATENTED rust proof process to be applied to all metal parts such as bumpers, spark plugs, etc., before the parts are nickel-plated or enameled has been adopted by the Emil Grossman Mfg. Co., Brooklyn, N. Y., maker of the Red Head spark plug. The idea has been developed to lengthen the life of the motor car accessory, to prevent waste of material by rust and to give a better appearance.

Levers Operate Vincent Wheel

In a description of the Vincent Clear-Room steering gear given in MOTOR AGE for Nov. 16, reference was made to the operation of the wheel by a button, which it is felt might mislead one into believing that a mere touch of a button would release the wheel. As a matter of fact there are two hooks, or levers, which must be operated simultaneously in order to drop the wheel.

Bumpers for Every Car

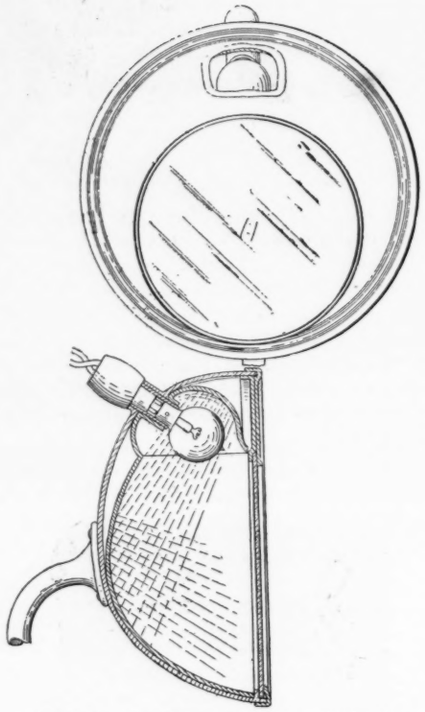
A new line of bumpers includes the diamond bar, channel, round bar, deep channel and spring, all fitted with brackets that may be attached to practically all cars. The "Truly Universal" is designed for any make having semi-elliptic front springs and the usual frame construction that goes with them. It is a clamp-on style. Several other models are for special cars, such as Packard, Chevrolet and so on. A line of rear tire holders and of running board holders in several different styles for Fords are marketed also. Au-To Compressor Co., Wilmington, Ohio.

An Adjustable Tire Holder

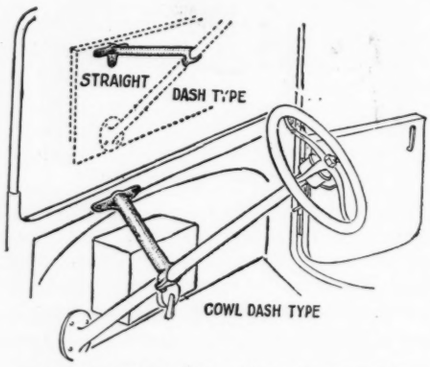
The Wilson tire holder is designed for instantaneous attachment to Ford cars and has five adjustments: Horizontal, for distance from car; angle, to conform with body; vertical, for height of tire from ground; lamp and license bracket; and tire lock, for tires of different sizes, with or without demountable rims. The holder is fastened to the rear cross bar of the frame by two U bolts and tie plates, the latter grooved to provide a positive lock on the channel steel side bars. Attachment is made without cutting or drilling or in any way interfering with the car frame or body. Rolled and bar steel are used for the construction, and the tire rests on its entire lower surface, lessening wear. The locking device is a hinged hasp that loops over a fixed lock bar securely riveted to the carried, the bar having four lock holes for 3 or 3½-in. tires. It is marketed by F. W. Stewart, Chicago.

New Three-Piece Universal Joint

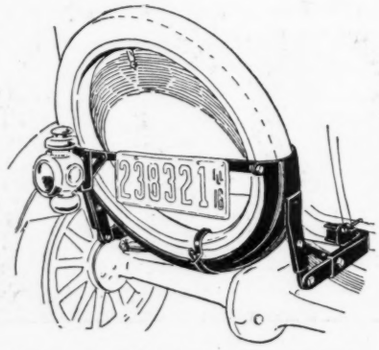
The Plank Flexible Shaft Machine Co. is preparing a new three-piece universal joint with only three working parts, the center-block, one slip-end shaft yoke and one transmission flange yoke. These parts will be inclosed in a pressed steel grease-tight metal housing. The company claims approximately five times the bearing surface of any other type of universal joint on the market and, consequently, longer wear for the parts. Lubrication is through the method of centrifugal force which distributes the lubricant from the dead center portion toward the bearings. The bearings are housed in by a grooved yoke construction which retains the lubricant at all times. A patented design is used in locking the center-block within the grooved yoke housing. The Three-Piece Universal Joint Co. has been formed and will make different sizes to care for jobs other than pleasure cars and commercial vehicles also.



A newly patented construction designed to eliminate headlight glare. Although this is a replica of the patent drawing, it is quite evident that the lines of refraction are incorrect



Steering column brace that also prevents excessive vibration



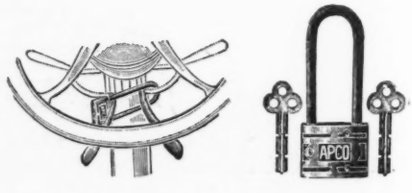
Wilson rear tire holder which has five adjustments

To Eliminate Headlight Glare

A patent has recently been granted to M. A. Leigh, 5118 Bryan Street, Dallas, Tex., covering a headlight construction which is designed to eliminate glare, at the same time projecting the beams in front of the car in the most desirable location. As shown in the illustration the bulb is located in a sub-lamp in the top of the shell. The rays are directed from this compartment to a reflector located in conventional manner and thrown ahead. The direct glare caused by the reflection direct from the bulb, as is the case in ordinary parabolic types, is thus eliminated, according to the claim of the inventor.

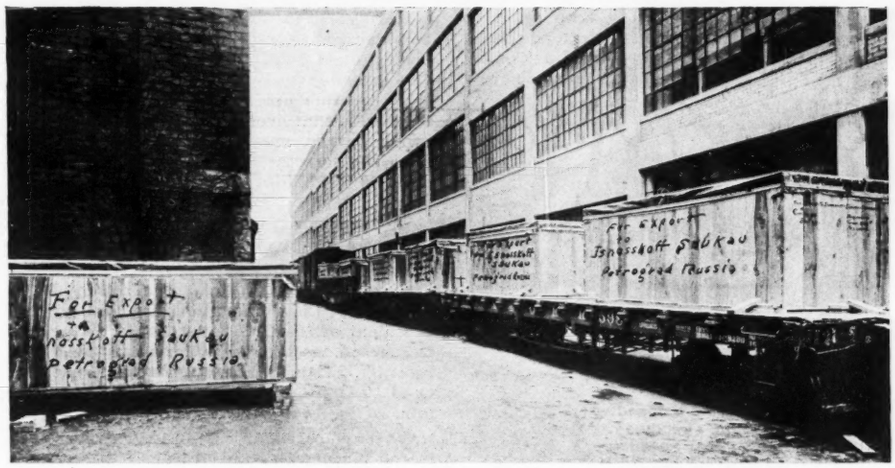
Apco Specialties for Fords

In a booklet containing specialties for Ford cars, the Auto Parts Co., Providence, R. I., offers several accessories for the Ford car. A spark and throttle lock at 60 cents is made from solid brass with nickel steel clasp. Two keys are furnished, and the company claims the lock will prevent anyone starting any Ford. Its operation is easy. A steering column brace supports the steering column and prevents the base from becoming loose at the dash. It also prevents excessive vibration of the steering wheel. The brace comes in two styles, one for cars with the cowl dash and another for cars with the straight dash, and is finished in black enamel. Price, $1.



Apco spark and throttle lock for Ford cars

Among the Makers and Dealers



CHALMERS DOES BIG EXPORT BUSINESS—Since the Chalmers foreign representative visited South America, Argentine has been leading in Chalmers export sales. Russia, however, keeps up well, as shown here, with mo e than 100 cars within 2 weeks.

CORNELIUS Promoted by Rust Proof—W. M. Cornelius has been elected assistant secretary of the Parker Rust Proof Co. of America.

Stimson to Sell Packards—Edward N. Stimson, formerly in charge of the Philadelphia branch of the Miller Tire Co., has been appointed manager of the Lancaster, Pa., branch of the Packard Motor Car Co. of Philadelphia.

J. & D. Tire Co. Factory—The J. & D. Tire Co., Charlotte, N. C., has completed its new factory. The company was formed under the direction of H. O. Smith, formerly president of the G. & J. Tire Co., Indianapolis. Production has begun already.

R. E. Davis with Moline Plow Co.—R. E. Davis, formerly in the engineering department of the J. I. Case T. M. Co., has become associated with the Moline Plow Co., Rock Island, Ill., in charge of tractor production work. This concern is averaging ten tractors a day, and the production will be double that within a short time.

New Truck Company Launched—The Penn Counties Motor Truck Co. has purchased a tract of land at Allentown, Pa., on which it is erecting a plant for the manufacture of motor trucks. The new enterprise is capitalized at $500,000. Trucks of ½ to 2-ton capacity will be made. The company plans to turn out 2,000 trucks complete within the coming year.

Changes at Covert Gear Co.—P. A. Clum, treasurer of the Covert Gear Co., has been given the position of president also to succeed B. V. Covert, who retires from the office Jan. 1. F. E. Mosher has been appointed general manager and A. A. Gloetzner sales manager, the latter succeeding Gould Allen at the Detroit office. Mr. Gloetzner was appointed chief engineer also.

Victor Company Buys Plant—The Victor Co. of Philadelphia has purchased the property of the Jenkintown Switch & Signal Co. The property includes 25 acres of land and nine buildings. The location previously selected at Grubbs Landing, Del., has been abandoned. C. Victor Stahl, vice-president of the company and inventor of the Victor motor, reports an order for 5,000 cars as soon as completed, fifty of which are to be shipped to a firm in Norway.

Pfeffer Returns from Cuba—C. A. Pfeffer, formerly vice-president and assistant general manager of the Chalmers Motor Co., has returned from his visit to Cuba.

Dickinson with Champion Motors—D. M. Dickinson has been appointed director of sales for the Champion Motors Co., Inc., Fulton, Ill., and Cleveland, Ohio.

Langerbacher with Duplex—Andrew Langerbacher has become sales manager of the Duplex Truck Co., Lansing, Mich. Mr. Langerbacher was formerly with the sales organization of the Reo Motor Car Co.

Butler Gets Promotion—John L. Butler, who for the last year has been in charge of the advertising department of the Pennsylvania Rubber Company at Jeannette, Pa., has been appointed advertising manager.

P. R. Creditors Get Money—Creditors of the defunct P. R. Mfg. Co. have received checks covering 5 per cent of their claims. A second distribution of 50 per cent will be made within the next 3 months.

Bassett with Buick—Harry H. Bassett has been appointed assistant general manager of the Buick Motor Co., Flint, Mich. Mr. Bassett had been with the Weston-Mott Co. for the last 11 years.

Core Leaves Sparks-Withington—Guy Core has resigned as advertising manager of the Sparks-Withington Co., Jackson, Mich., to take a similar position with the Springfield Body Co.

Blagden Heads American Malleables—A. S. Blagden has been elected president of the American Malleables Co., Lancaster, N. Y., succeeding W. G. Pearce, who has been made chairman of the board. The company specializes in malleable iron motor car castings.

Personnel of New Tractor Company—Bert B. Parrott of Jackson, Mich., the inventor of the new tractor to be manufactured by the Highway Tractor Co., organized in Indianapolis with a capital stock of $2,000,000, will be the chief engineer of the concern. J. H. O'Brien, at present purchasing agent for the Ross Automobile Co., will become the purchasing agent for the new tractor company. Officers of the company are: President, Charles G. McCutcheon; vice-president, Carl G. Fisher; treasurer, James A. Allison, and secretary, Henry F. Campbell.

Jennings Gets New Position—W. F. Jennings has become eastern sales and advertising manager of the Bound Brook Oil-less Bearing Co. He has been connected with this company for nearly 3 years.

Chapman with Dort—W. A. Chapman has been made field manager in western Texas for the Dort Motor Car Co., Flint, Mich. Mr. Chapman was formerly the sales manager for the Rock Island Implement Co. of Oklahoma.

Schaffner with Denneen Motor Co.—G. H. Schaffner has been appointed manager of local sales and service for Denmo trucks by the Denneen Motor Co., Cleveland, Ohio. Mr. Schaffner was formerly with the Safe Motor Sales Co.

Dingley with Mitchell—Bert Dingley, who was a member of the champion team supported by the Chalmers Motor Co. 6 years ago, has been appointed traveling representative for the Mitchell Motors Co. with headquarters at Los Angeles.

Films to Demonstrate Tractors—The operation of the tractor manufactured by the Moline, Ill., Plow Co. is being shown in moving pictures. One thousand feet of film will be used for advertising in districts at a distance from the annual tractor demonstrations.

Harroun Building Progresses—The foundation of the first unit of the Harroun buildings at Wayne, Mich., has been finished. The structure will house the assembly units and will be 75 by 540 ft. when completed. The power plant will be started next.

Christiansen Is Promoted—E. S. Christiansen is to manage the Detroit office of the United Smelting & Aluminum Co., New Haven, Conn. He was formerly purchasing agent. W. T. Schmitt, formerly of the Bosch Magneto Co., has been appointed assistant manager at the Detroit office.

Rex Salesmen to Meet—The Rex Ignition Mfg. Co., New York, will have its annual salesmen's convention Jan. 3-5. Meetings of the sales staff and distributors will be held twice daily, and the evenings will be given over to entertainment, a theater party being scheduled for Jan. 5. Bonuses will be distributed to the leaders in sales for the year.

Maxwell Fills Vacancies—J. R. Morron has been elected a director and member of the executive committee of the Maxwell Motor Co., Detroit, to fill the vacancy caused by the resignation of Eugene Meyer, Jr. J. C. Brady was elected chairman of the board of directors and of the executive committee to succeed J. C. Jay, Jr. Mr. Jay will continue as a director of the company and as vice-president.

Peerless to Enter Wisconsin—A tire and rubber goods industry will be established in Green Bay, Wis., soon by the Peerless Tire & Rubber Co., which has just been incorporated in Wisconsin by F. E. Burrell, John T. Jessen and A. W. Brown, who now are operating a factory in the Ohio rubber district. The company is capitalized at $50,000. It owns the molds and controls the output of the existing plant. The product is being marketed from Green Bay at this time, but as soon as practicable it is planned to transfer manufacturing operations from Ohio to Wisconsin.

From the Four Winds

LEHIGH Valley Show—The third annual Lehigh valley motor show will be held at South Bethlehem, Pa., Feb. 19-24 in the Coliseum. The annual truck show will follow 2 days later.

Roads Committee for Club—The good roads committee of the Detroit board of commerce will be transferred to the Detroit Automobile Club to carry on good roads work in the name of the latter organization.

May Bond Motor Car Owners—The Kansas legislature is to consider requiring a bond of every motor car owner in the state, so that anyone injured by a car can recover full damages. The argument is that many owners have insufficient resources to pay indemnity for accidents for which they are liable and that few of them carry insurance.

Circuit Riders for Clubs—Missouri has adopted a novel scheme in prosecuting the good roads propaganda undertaken by the new Missouri Motor Association. A series of meetings is held on a circuit, at which meetings officers of the association are present and speak. At each place auxiliaries of the state body are formed.

Fifty-Two at Baltimore Show—Fifty-two dealers will exhibit at the Baltimore motor show Jan. 23-27. Positions have been allotted. One of the large companies, the Maxwell Motor Co., will not have space at the show but will hold an exhibit of its own in its large show room. Commercial vehicles may be exhibited, though some of the dealers are opposed to it now. If not admitted to the armory the commercial vehicle dealers plan to hold shows in their places of business.

Kansas Good Roads Campaign Hot—So aroused is Kansas in general over the subject of good roads that the position of chairman of the committee on roads is one of the most popular ones in the legislature this session. Several bills affecting good roads work are to be introduced. The Topeka, Kan., Automobile Club, however, is urging amendments rather than an entirely new law. One of the amendments to the Hodges law now in effect probably will be a redistribution of the expenses of roads—making the county pay half, the township one-fourth and the benefited district one-fourth.

Oklahoma Dealers to Use Tent—So great has been the demand for space at the motor show to be staged in Oklahoma City Jan. 23-26 that a large tent will be used for the overflow of commercial cars and accessories. The principal part of the show will be in the auditorium, the interior of which will be decorated to represent a Japanese tea garden. This is the first mid-winter motor show in this territory. George W. Woods, who staged the 200-mile road race and other events in 1915, is manager. The Oklahoma City Motor Car Dealers' Association is sponsor.

Bloomington, Ill., Dealers Unite—The motor car dealers of Bloomington, Ill., have formed an organization with Joseph Lockwood as president and Frank Cole as secretary. Twenty firms joined at the first meeting, and the rest are expected to come in later. The association intends to maintain an active organization, holding meetings once a week with luncheon at a downtown hotel, and committees will try to keep up interest and enthusiasm. All motor car and accessory dealers, garage owners and those who do any kind of repair business in the line of cars, tires and so on have been asked to join. The establishment of a clearing house for used cars is being considered. The association also will offer to take over the management of the annual dealers' show, now in the hands of the McLean County Automobile Club. A bad debt list will be prepared for benefit of members.

Coming Motor Events

RACES
—1917—

May 19—Metropolitan Trophy, New York speedway.
†May 30—Indianapolis speedway.
†June 9—Chicago speedway.
June 23—Cincinnati speedway.
†July 4—Omaha speedway.
†July 14—Des Moines speedway.
†July 28—Tacoma speedway.
August 4—Kansas City speedway.
†September 3—Cincinnati speedway.
†September 15—Providence speedway.
†September 29—New York speedway.
October 6—Kansas City speedway.
October 13—Chicago speedway.
October 27—New York speedway.

†A. A. A. championship events for 1917.

MEETINGS

January 9-11—Midwinter meeting, Society of Automobile Engineers.

SHOWS

December 30-January 6—Cleveland, Ohio, show.
January 2-10—Salon, Hotel Astor, New York.
January 5-11—Milwaukee, Wis., show.
January 6-13—New York show.
January 12-20—Philadelphia show.
January 13-20—Montreal show.
January 14-16—Rockford, Ill., show.
January 19-24—Manchester, N. H., show.
January 20-27—Detroit show.
January 20-27—Montreal, Can., show.
January 22-27—Oklahoma City show.
January 22-27—Rochester, N. Y., show.
January 23-27—Allentown, Pa., show.
January 23-27—Baltimore show.
January 25-27—Asheville, N. C., show.
January 27-February 3—Chicago show.
January 27-February 3—Columbus, Ohio, show.
January 27-February 5—York, Pa., show.
January 28-February 3—Wilmington, Del., show.
January 29-February 3—Buffalo show.
February 3-10—Minneapolis show.
February 5-10—Bangor, Me., show.
February 10-17—San Francisco show.
February 10-17—Hartford, Conn., show.
February 12-17—Kansas City show.
February 12-17—Louisville, Ky., show.
February 13-16—Grand Forks, N. D., show.
February 13-17—Sioux City, Ia., show.
February 14-17—Peoria, Ill., show.
February 19—Pittsfield, Mass., show.
February 19-24—Bridgeport, Conn., show.
February 19-24—Des Moines, Ia., show.
February 19-24—Duluth, Minn., show.
February 19-24—Grand Rapids, Mich., show.
February 19-24—St. Louis Show.
February 19-24—Syracuse show.
February 26-March 3—Omaha, Neb., show.
March 1-3—Urbana, Mich., show.
March 3-10—Boston show.
March 6-10—Fort Dodge, Ia., show.
March 14-17—Davenport, Ia., show.
March 14-17—Mason City, Ia., show.
March 18-23—Cedar Rapids, Ia., show.

New York to Consider Bills—Two bills to be presented to the New York legislature propose radical changes in motor vehicle laws. One provides for universal traffic regulations, and the other amends the motor vehicle law to provide that every driver of a car, whether owner or not, must first obtain a certificate from the secretary of state; that any person can file complaint against reckless or improper driving; and that the secretary of state shall be represented at hearings, having the right to revoke the offender's right to drive a car if the complaint is sustained.

Humphrey Heads Road Federation—D. S. Humphrey, Cleveland, Ohio, has been elected president of the Ohio Good Roads Federation to succeed Jesse Taylor, Jamestown, who died recently. Mr. Humphrey was treasurer. O. J. Demuth, New Philadelphia, succeeds him.

Where Tire Rubber Grows—A rubber tree in full maturity produces from 3 to 5 pounds of rubber a year. Usually about 100 trees are planted to the acre. Time was when Brazil was the crude rubber center of the world, but today the plantations of the Far East are producing four times as much rubber as the forests of the Amazon. So your tires may be very Oriental indeed.

Tires Enter Norway Thus—Norway gets its tires in an indirect way. All are imported through London, where they are consigned only to the Royal Automobile Club of Christiania under an arrangement made with the British authorities. For every new tire delivered an old worn-out one must be turned in to the club. Evidently this is a club with which it pays to stand in well.

Stolen Cars in Chicago—A tabulation of crime for 1916 shows more motor cars were stolen in Chicago during 1916 than in former years. Ten per cent of the cars were reported unrecovered. In 3 months 1,000 were taken, the total since January being more than 3,000. Part of the increase is attributed to the increase in number of owners. Several gangs of car thieves were captured during the year and sent to the penitentiary. Of the $2,000,000 loot, $300 was for cars not recovered and $50,000 for motor car accessories.

Where Cars Leap Cliffs—The cliff often has figured in fiction as the scene of the lover's leap to join the sweetheart in death or the villian's fall to justice, but one of our foreign neighbors carries it further and makes cars leap the cliff to escape falling into the hands of others. Serbia had pressed cars into service when the probability of their falling into the enemy's hands became apparent. Rather than have this happen, cars by the score were opened up on a road with a right angle turn and a sheer drop of 400 ft. to a stream.

New Oregon Roads Law Perhaps—If the law to be introduced at the coming session of the Oregon legislature is adopted, motor cars will bear twice the present tax burden, and all the net proceeds from motor vehicle taxes will be used for the construction and maintenance of roads. Motor vehicles will be classed in two divisions, pleasure cars being taxed according to weight and horsepower and motor trucks according to horsepower, weight and maximum carrying capacity. Now all motor vehicles are taxed according to horsepower, the minimum tax being $3 and the maximum, $10. The new law would tax the smallest cars $5 and raise the maximum to $25.